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Edwin Vaughan Greene

INDEXED

TRANSACTIONS

—OF—

The National Association of Cotton Manufacturers,

SUCCESSOR TO

New England Cotton Manufacturers' Association,

ORGANIZED AS THE HAMPDEN COUNTY COTTON SPINNERS' ASSOCIATION.

Founded 1854. **Incorporated Dec. 1, 1894.**

NO. 93.

SEMI-ANNUAL MEETING,

Held at The Griswold, New London, Conn.,

SEPTEMBER 9-11, 1912.

Office of the Association:
Room 501, International Trust Building, 45 Milk Street,
Corner of Devonshire St., Boston, Mass.

1913

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ENTERED ACCORDING TO ACT OF CONGRESS
IN THE YEAR 1913
BY THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS,
IN THE OFFICE OF THE LIBRARIAN OF CONGRESS
AT WASHINGTON.

By vote of the Board of Government, the price of the *Transactions* is $5.00 per copy to non-members. The price of this issue and those subsequent to Volume 60 is $1.00 each to members, and the prices of copies previous to Volume 61, is 50 cents to members, but each member is entitled to a copy as a part of the privilege of membership.

CHARTER.

No. 6091.

Commonwealth of Massachusetts.

BE IT KNOWN, That whereas, EDWARD W. THOMAS, C. J. H. WOODBURY, WILLIAM J. KENT, F. M. MESSENGER, HARRY T. WHITIN, ARTHUR H. LOWE, ALBERT F. KNIGHT, ALFRED M. GOODALE, FRED C. MCDUFFIE and GEORGE W. BEAN have associated themselves with the intention of forming a corporation under the name of the NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION, for the purpose of encouraging scientific investigation and experiment as to the methods of manufacturing cotton; collecting and imparting information relating to this industry, promoting social intercourse among its members; and establishing and maintaining a library of works on textiles in the city of Boston, and have complied with the provisions of the Statutes of this Commonwealth in such case made and provided, as appears from the certificate of the President, Treasurer and Directors of said corporation, duly approved by the Commissioner of Corporations, and recorded in this office.

NOW, THEREFORE, I, WILLIAM M. OLIN, Secretary of the Commonwealth of Massachusetts, do hereby certify that said EDWARD W. THOMAS, C. J. H. WOODBURY, WILLIAM J. KENT, F. M. MESSENGER, HARRY T. WHITIN, ARTHUR H. LOWE, ALBERT F. KNIGHT, ALFRED M. GOODALE, FRED C. MCDUFFIE and GEORGE W. BEAN, their associates and successors, are legally organized and established as and are hereby made an existing corporation under the name of the

NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION,

with the powers, rights and privileges, and subject to the limitations, duties and restrictions which by law appertain thereto.

Seal of the Commonwealth of Massachusetts.

Witness my official signature hereunto subscribed, and the seal of the Commonwealth of Massachusetts hereunto affixed this first day of December, in the year of our Lord one thousand eight hundred and ninety-four.

WILLIAM M. OLIN,
Secretary of the Commonwealth.

Commonwealth of Massachusetts.

(Acts of 1895, Chap. 163.)

AN ACT TO AUTHORIZE THE NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION TO HOLD ITS MEETINGS WITHOUT THE COMMONWEALTH.

Be it enacted, etc., as follows:

SECTION 1. The New England Cotton Manufacturers' Association is hereby authorized to hold its meetings in any state or territory of the United States and in the District of Columbia; provided, however, that its annual meeting shall be held in this Commonwealth at least once in five years.

SECT. 2. This act shall take effect upon its passage. [Approved March 23, 1895.]

No. 252.

Commonwealth of Massachusetts.

BE IT KNOWN that whereas

NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION,

a corporation organized under the laws of this Commonwealth and subject to the provisions of chapter one hundred and twenty-five of the Revised Laws has complied with the provisions of chapter one hundred and nine of the Revised Laws, as appears from the certified copy of the order of the Commissioner of Corporations, authorizing said corporation to change its name and adopt the name of

THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS,

and the certificate of the Vice-President and Acting President, Treasurer and Directors of said corporation duly filed in this office pursuant to the provisions of section ten of the aforesaid chapter one hundred and nine of the Revised Laws.

NOW THEREFORE, I, William M. Olin, Secretary of the Commonwealth of Massachusetts, DO HEREBY CERTIFY, that the name which said corporation shall bear is

THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS,

which shall hereafter be its legal name.

Seal of the Commonwealth of Massachusetts.

WITNESS my official signature hereunto subscribed, and the Great Seal of the Commonwealth of Massachusetts hereunto affixed this twenty-fifth day of June in the year of our Lord one thousand nine hundred and six.

WM. M. OLIN,
Secretary of the Commonwealth.

THE

NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

SUCCESSOR TO
NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION.

FOUNDED 1854.
INCORPORATED DECEMBER 1, 1894.

CONSTITUTION AND BY-LAWS.

ACTIVE MEMBERS.

ARTICLE 1. Any person who is actively engaged as President, Treasurer, Agent, Superintendent or Manager in the manufacture, printing or finishing of cottons shall be eligible for active membership.

ELECTION OF MEMBERS.

ARTICLE 2. All nominations for membership shall be made in writing, at least one week before the date of any regular meeting, and shall be considered by the Board of Government, and reported to the meeting, favorably or adversely, for the action of the Association. *Provided*, that in case the Board shall decide to report adversely upon any nomination, the member who shall have made it shall be informed of the intention so to report, in order that he may have an opportunity to withdraw the name. Upon such report active members may be admitted, if they obtain a majority of votes of the members present and voting therefor, by acceptance in writing, and paying an admission fee of ten dollars, and maintaining their membership by the payment of an annual assessment not exceeding ten dollars. Any member failing to pay two successive assessments shall cease to be a member at the end of six months from the date when such second assessment shall become due. Any member may withdraw from the Association upon payment of all arrearages, first giving notice of his intention so to do, in writing, to the Secretary, and the Board of Government may

accept such resignation; and any member may be expelled for cause, at any regular meeting, two-thirds of the members present voting therefor.

ASSOCIATE MEMBERS.

ARTICLE 3. Persons engaged in the manufacture of cotton or cotton fabrics, or the manufacture of textile machinery, or industries kindred to the cotton manufacture, may become associate members of the Association. The methods of application, nomination, election and withdrawal from the Association being under the same conditions as those provided for active members in Article 2 excepting that this class of membership does not carry with it the privilege of voting or speaking, except by permission from the Board of Government or a vote of the Association to allow permission.

The initiation fee for associate members shall be twenty-five dollars, and the annual assessment shall be double the sum annually voted for active members.

Associate members may be expelled by a majority vote of the Board of Government.

HONORARY MEMBERS.

ARTICLE 4. Honorary members may be elected, when recommended by the Board of Government, at any regular meeting of the Association, who shall be enrolled as such, and shall be entitled to attend the meetings of the Association and participate in its proceedings, without the right to vote. They shall not be subject to payment of admission fees or assessments. No person actively engaged in cotton manufacture shall be eligible to honorary membership.

LIFE MEMBERS.

ARTICLE 5. Any active or associate member by the single payment of one hundred dollars shall be exempt from all future payments for dues and shall become a life member having all the privileges of active members.

All moneys thus paid shall be invested as a permanent fund by the Treasurer acting under the direction of the Board of Government, of which the income only shall be subject to appropriation for current expenses.

ARTICLE 6. It shall be the duty of all members of the Association to make returns to the Secretary of such statistics as may be called for by him, under the direction of any committee duly appointed for the collection of statistics, when not incompatible with private interests.

OFFICERS.

ARTICLE 7. The officers of this Association shall be a President, two Vice-Presidents, nine Directors, a Treasurer, Secretary, and Auditor of Accounts.

ELECTION OF OFFICERS.

ARTICLE 8. At each annual meeting there shall be chosen by ballot a President, two Vice-Presidents and three Directors; the President and Vice-Presidents to serve one year, and the three Directors shall be chosen for terms of three years, unless sooner removed as hereinafter provided.

DUTIES OF OFFICERS.

ARTICLE 9. The President, or in his absence the senior Vice-President present, shall preside at all meetings of the Association and of the Board of Government. All officers shall hold their respective offices until their successors shall be chosen and accept their positions.

ARTICLE 10. The President, Vice-Presidents and Directors, in addition to the Presidents in office for five years previous to May 1 of any year, shall constitute a Board of Government, and have under their care and direction all matters pertaining to the management of the Association; and five of their number shall constitute a quorum for the transaction of business. Meetings of the board may be called by the President, at such time and place as he may deem expedient, giving each member a written or printed notice of the same at least five days before the day of meeting. At their first meeting the board shall elect a Treasurer, Secretary, and Auditor of Accounts for the year ensuing, and fix the amount of compensation of the Secretary. All vacancies in their board occasioned by death or resignation or removal, shall be filled by the board; and the persons so elected shall hold their offices until the next annual meeting except as hereinafter provided. The board may, from time to time, as they shall deem expedient, appoint committees, from among their own board or from the members at large, to collect statistical information, examine new inventions or processes in manufacturing goods, as also to prepare essays on subjects of interest to the Association.

ARTICLE 11. The Treasurer shall keep a book in which all receipts and payments of money shall be entered, collect all moneys due the Association, and disburse the same upon the written order of the Board of Government. At the annual meeting in each year he shall make an exhibit of his accounts, or oftener if the Board of Government require it. He shall notify the members of assessments voted, and cause them to be collected in a reasonable time.

ARTICLE 12. The Secretary shall attend all meetings of the Association and of the Board of Government, and keep accurate records of their doings. In the absence of the Secretary at any meeting, a Secretary *pro tem.* may be appointed by the presiding officer, who shall be sworn to do all things, while in office, required of the Secretary.

ARTICLE 13. The Auditor shall examine the accounts of the Treasurer annually, and report at each meeting the state of the finances.

ARTICLE 14. Any officer who shall unreasonably absent himself from three consecutive meetings of the Board of Government of which he is a member, or shall otherwise neglect or refuse to perform the duties of his office, may be removed from office at any regular meeting of the Board of Government by a vote of a majority of the members present and voting thereon, a notice of such proposed action to be sent to him by mail at least one week previous to the meeting.

MEETINGS.

ARTICLE 15. The annual meeting of the members of the Association shall be held on the last Wednesday of April, or at such other time, and at such hour and place as the Board of Government may appoint. There shall also be a semi-annual meeting of the Association on the last Wednesday of October, in each and every year, or at such other time, and at such place and hour as the Board of Government may appoint.

Special meetings may be called by the Board of Government whenever they deem it expedient, or upon the written application of any ten members, made to the Secretary.

ARTICLE 16. All meetings of the members of the Association shall be in pursuance of a written or printed notice, addressed to each member, with the name of the President or Secretary attached thereto, and deposited in the Post Office ten days at least before the day of meet-

ing, specifying the time and place of meeting; and at all such meetings fifteen members shall constitute a quorum for the transaction of business.

ARTICLE 17. Amendments to the By-Laws may be made at any stated meeting of the Association by a two-thirds vote; *provided*, notice of such proposed amendment be given in writing at a previous meeting, and also notice be given to each member by the Secretary, of the pendency of such amendment, ten days at least before any such meeting.

BOARD OF GOVERNMENT.

1912.

PRESIDENT.

EDWIN FARNHAM GREENE, . . LAWRENCE, MASS.

VICE-PRESIDENTS.

FREDERICK A. FLATHER, . . . LOWELL, MASS.
GEORGE P. GRANT, JR., . . . FITCHBURG, MASS.

DIRECTORS.

WILLIAM AMORY, ... BIDDEFORD, ME.
ALBERT F. BEMIS, ... BOSTON, MASS.
WILLIAM M. BUTLER, ... NORTH ADAMS, MASS.
ALBERT GREENE DUNCAN, . . COHOES, N. Y.
WILLIAM N. KIMBALL, . . . WOONSOCKET, R. I.
RUSSELL B. LOWE, ... FITCHBURG, MASS.
FREDERICK B. MACY, ... NEW BEDFORD, MASS.
R. M. MILLER, JR., ... CHARLOTTE, N. C.
W. FRANK SHOVE, ... FALL RIVER, MASS.

PRESIDENTS EX-OFFICIIS.

WILLIAM D. HARTSHORNE, . . LAWRENCE, MASS.
FRANKLIN W. HOBBS, . . . BOSTON, MASS.
CHARLES T. PLUNKETT, . . . ADAMS, MASS.

AUDITOR.

C. E. ROBERTS, ... BOSTON, MASS.

SECRETARY AND TREASURER.

C. J. H. WOODBURY, P. O. Box 3672, BOSTON, MASS.

OFFICE OF THE ASSOCIATION:

ROOM 501, INTERNATIONAL TRUST BUILDING, 45 MILK STREET, CORNER OF DEVONSHIRE AND ARCH STREETS, BOSTON, MASS.

OFFICERS OF THE ASSOCIATION,

FROM THE FIRST ORGANIZATION.

PRESIDENTS.

Ezekiel A. Straw,	1865–78	Russell W. Eaton,	1897–98
Amos D. Lockwood,	1878–80	Stephen A. Knight,	1898–99
John Kilburn,	1880–83	Frederick E. Clarke,	1899–99
William C. Lovering,	1883–85	David M. Thompson,	1900–01
Richard Garsed,	1885–86	Charles H. Fish,	1901–03
Joseph S. Ludlam,	1886–88	Herbert E. Walmsley,	1903–05
Henry F. Lippitt,	1888–89	James R. MacColl,	1905–07
Walter E. Parker,	1889–92	William D. Hartshorne,	1907–08
Robert McArthur,	1892–94	Charles T. Plunkett,	1908–10
Edward W. Thomas,	1894–95	Franklin W. Hobbs,	1910–12
Alfred M. Goodale,	1895–96	Edwin Farnham Greene,	1912–
Arthur H. Lowe,	1896–97		

VICE-PRESIDENTS.

Amos D. Lockwood,	1865–77	William J. Kent,	1894–97
William A. Burke,	1865–73	Fred. C. McDuffie,	1895–00
John C. Palfrey,	1873–76	Henry T. Whitin,	1897–00
Edward Atkinson,	1876–78	Charles H. Richardson,	1900–01
A. G. Cumnock,	1877–80	George H. Hills,	1900–02
Charles Nourse,	1878–81	Herbert E. Walmsley,	1901–03
William F. Goulding,	1880–83	Alfred E. Adams,	1902–03
Richard Garsed,	1881–85	James R. MacColl,	1903–05
Joseph S. Ludlam,	1883–86	Wm. D. Hartshorne,	1903–07
Walter E. Parker,	1885–89	George A. Ayer,	1905–07
Richard B. Borden,	1886–88	Charles T. Plunkett,	1907–08
Arnold B. Sanford,	1888–91	Franklin W. Hobbs,	1908–10
Robert McArthur,	1889–92	George Otis Draper,	1907–11
Simeon B. Chase,	1891–93	Edwin Farnham Greene,	1910–12
Edward W. Thomas,	1892–94	Frederick A. Flather,	1911–
Alfred M. Goodale,	1893–95	George P. Grant, Jr.,	1912–

DIRECTORS.

Jones S. Davis,	1865–69	Edward W. Thomas,	1888–92
Charles Nourse,	1865–78	William W. Whitin,	1888–93
Phinehas Adams,	1865–74	Robert R. Smith,	1889–92
William P. Haines,	1865–69	Alfred M. Goodale,	1890–93
Thomas J. Borden,	1865–78	William J. Kent,	1891–94
Daniel D. Crombie,	1865–68	Herman F. Straw,	1891–93
A. M. Wade,	1868–69	Fred C. McDuffie,	1892–95
David J. Johnston,	1869–70	George W. Bean,	1892–95
Frederick E. Clarke,	1869–75	Frank M. Messenger,	1893–95
A. G. Cumnock,	1869–77	Albert F. Knight,	1893–99
Cyrus I. Barker,	1875–80	Arthur H. Lowe,	1894–96
Hervey Kent,	1877–81	Henry T. Whitin,	1894–97
David J. Johnston,	1878–82	Herbert L. Pratt,	1895–98
Walter Paine, 3d,	1878–80	Stephen A. Knight,	1895–98
Chas. L. Lovering,	1878–83	John Eccles,	1895–99
Richard Garsed,	1880–81	Russell W. Eaton,	1896–97
William H. Jennings,	1880–83	Charles H. Richardson,	1897–00
Chas. D. McDuffie,	1883–83	George H. Hills,	1897–00
Walter E. Parker,	1881–85	John T. Meats,	1898–01
John W. Danielson,	1881–85	Alfred E. Adams,	1899–02
William E. Barrows,	1882–83	A. Tenny White,	1899–02
Rufus A. Maxfield,	1883–86	Charles H. Fish,	1900–01
George W. Weeks,	1883–86	Herbert E. Walmsley,	1900–01
Henry S. Howe,	1883–87	Wm. D. Hartshorne,	1901–03
Richard B. Borden,	1883–86	James R. MacColl,	1901–03
O. S. Brown,	1885–91	George F. Whitten,	1898–04
Henry F. Lippitt,	1885–88	W. B. Smith Whaley,	1901–04
Wilbur A. Stiles,	1886–88	James R. Montgomery,	1902–05
Robert McArthur,	1886–89	Wm. D. Pennell,	1902–05
Stephen N. Bourne,	1886–91	George A. Ayer,	1904–05
John Kilburn,	1870–80	Philip A. Mathewson,	1903–06
William P. Haines,	1874–78	Christopher P. Brooks,	1904–07
S. S. Spencer,	1887–90	Charles T. Plunkett,	1905–07

DIRECTORS.— Continued.

Roscoe S. Milliken,	1905–08	David S. Johnston,	1908–12
Franklin W. Hobbs,	1906–08	Albert F. Bemis,	1910–
George Otis Draper,	1906–07	Russell B. Lowe,	1910–
William H. Loftus,	1905–10	Frederick B. Macy,	1910–
Henry F. Mansfield,	1906–10	R. M. Miller, Jr.,	1910–
Robert Beatty,	1906–11	William Amory,	1911–
Edwin Farnham Greene,	1907–10	William N. Kimball,	1911–
Frederick A. Flather,	1907–11	W. Frank Shove,	1911–
John W. Knowles,	1907–10	William M. Butler,	1912–
Joseph Merriam,	1908–11	Albert Greene Duncan,	1912–
George P. Grant, Jr.,	1903–12		

AUDITORS.

Benjamin Saunders,	1865–71	J. Herbert Sawyer,	1882–00
John C. Palfrey,	1871–73	C. E. Roberts,	1900–
Henry D. Sullivan,	1873-82		

SECRETARY AND TREASURER.

Ambrose Eastman,	1865–94	C. J. H. Woodbury,	1894–

TRANSACTIONS.

Pursuant to legal notice the stated semi-annual meeting of The National Association of Cotton Manufacturers (being the ninety-third meeting of the Association), was held at The Griswold, New London, Conn., on Monday, Tuesday and Wednesday, September 9, 10, and 11, 1912.

There were present 315 persons, of which 142 were members and 173 their guests.

MEMBERS.

JOHN T. ALMY,
JOSHUA D. ARMITAGE,
FREDERICK M. ARMSTRONG,
CLINTON W. ATWOOD,
H. C. ATWOOD,
GEORGE A. AYER,
DAY BAKER,
JOEL M. BARNES,
GEORGE S. BARNUM,
DANIEL MOORE BATES,
FREDERICK H. BISHOP,
AMOS M. BOWEN,
GARRETT D. BOWNE, JR.,
ROBERT WILLIAM BOYS,
WALTER H. BRADLEY,
HENRY GORDON BRINCKERHOFF,
JAMES T. BROADBENT,
FLETCHER S. BROWN,
WILLIAM H. BUCKLEY,
ALBION L. BUCKNAM,
W. IRVING BULLARD,
JOHN H. BURGHARDT,
SAMUEL T. BUTTERWORTH,
L. W. CAMPBELL,
FREDERIC A. CHASE,
THOMAS J. CLEXTON,
JAMES E. COBURN,
MELVIN H. COFFIN,
FRANK B. COMINS,
JAMES A. COOPER,
DAVID A. COREY,
PETER H. CORR,
LUCIUS B. CRANSKA,
HARRY L. CROCKER,
LEONARD W. CRONKHITE,
WILLIAM W. CROSBY,

GEORGE A. CUTTER,
DANIEL J. DANKER,
ROGERS W. DAVIS,
FRANCIS W. DEAN,
R. J. H. DELOACH,
HENRY C. DEXTER,
PARDON N. DEXTER,
FRANK J. DUTCHER,
JOHN ECCLES,
JESSE P. EDDY,
GROSVENOR ELY,
JOHN PRESCOTT FARNSWORTH,
BENJAMIN FESSENDEN,
WILLIAM FIRTH,
FREDERICK A. FLATHER,
M. F. FOSTER,
E. T. FOWLER,
ARTHUR C. FREEMAN,
C. H. FRISBIE,
JOHN H. GILES,
LYMAN B. GOFF,
ALBERT H. GREEN,
EDWARD FARNHAM GREENE,
S. HAROLD GREENE,
ARTHUR H. GULLIVER,
J. FRED HAVEY,
JOHN HILL,
GEORGE C. HINCKLEY,
FRANKLIN W. HOBBS,
CHARLES E. HODGES,
J. CARLTON HOWE,
FREDERICK W. HOWE,
CHURCHILL HUNGERFORD,
JOSEPH B. JAMIESON,
JOSEPH B. JAMIESON, Jr.,
JOHN E. KENDRICK,
FRANK B. KENNEY,
WILLIAM N. KIMBALL,
FRED S. KLEBART,
WALTER B. KNIGHT,
FRED LACEY,
HAROLD LAWTON,
WILLIAM H. LOFTUS,
HARRY D. LORD,
RUSSELL B. LOWE,
STEPHEN C. LOWE,
J. IRVINE LYLE,
JAMES R. MACCOLL,
R. M. MACKINTOSH,
FREDERICK B. MACY,
AUGUSTUS B. MARBLE,
JOHN P. MARSTON,
FREDERICK R. MASON,
JOHN W. MAYOR,
EDWARD J. MCCAUGHEY,
RALPH E. MCCAUSLAND,
ALLAN MCNAB, Jr.,
ROBERT B. MEIKLE,
JOSEPH MERRIAM,
MELDON H. MERRILL,
A. B. MOLE,
JAMES F. MONOGHAN,
J. R. MONTGOMERY,
S. ST. J. MORGAN,
WILLIAM MUIR,
CHARLES M. MUMFORD,
W. C. MURPHY,
WILLIAM G. NICHOLS,
ALBERT W. NOONE,
SIDNEY B. PAINE,
FREDERICK W. PARKS,
WILLIAM E. PECK,
WALTER T. PHIPPS,
FRANK W. REYNOLDS,
E. A. RUSDEN,
RAY M. SANFORD,
ALBERT H. SAWTELL,
ALBERT L. SCOTT,

ALBION K. SEARLS,
HERMANN SEYDEL,
CHRISTOPHER J. SHAMBOW,
ARTHUR N. SHELDON,
FRANK P. SHELDON,
CHARLES P. SLOCUM,
HARRY M. SMITH,
JOSEPH J. SMITH,
THOMAS HENRY SMITH,
W. H. SMITH,
HENRY B. SPRAGUE,
FRED W. STEELE,
GEORGE F. STEELE,
WALLACE I. STIMPSON,
JAMES STRANG,
JAMES O. SWEET,
GAY D. THAYER,
EDWARD W. THOMAS,
JAMES P. TOLMAN,
GEORGE A. VAUGHAN,
ROBERT S. WALLACE,
ALBERT WALTON,
ALEXANDER S. WEST,
WILLIAM T. WESTERMAN,
NELSON D. WHITE,
HAROLD C. WHITMAN,
C. J. H. WOODBURY,
FRANK F. WOOLLEY.

GUESTS.

FRANK L. ALLEN, Readville, Mass.
A. A. ASPINWALL, Pawtucket, R. I.
F. L. BABCOCK, Boston, Mass.
P. R. BABCOCK, Boston, Mass.
His Excellency, SIMEON E. BALDWIN, LL.D., Governor of Connecticut, New Haven, Conn.
H. D. BALLOU, Woonsocket, R. I.
JOHN F. BANNON, Mansfield, Mass.
J. B. BARRETT, Providence, R. I.
A. E. BENNERS, Philadelphia, Pa.
A. E. BENNERS, Jr., Philadelphia, Pa.
T. W. BLISS, Providence, R. I.
P. C. BRYANT, Fitchburg, Mass.
WILLIAM STARR BULLOCK, New York, N. Y.
FRANK H. BURT, Boston, Mass.
PHILIP H. BURT, Boston, Mass.
H. O. BUZZELL, Woonsocket, R. I.
C. A. CHASE, Boston, Mass.
FRED A. CHASE, Providence, R. I.
F. L. CHASE, Providence, R. I.
LEONARD A. CHASE, Boston, Mass.
J. T. CHIDSEY, Bristol, Conn.
F. H. CHILDS, Boston, Mass.

C. H. CLARK, Boston, Mass.
GEORGE W. CONFREID, Shelton, Conn.
R. H. CREFT, Cleveland, Ohio.
M. C. FISH, Providence, R. I.
S. W. FLESHEIM, Cleveland, Ohio.
A. S. FULLER, Providence, R. I.
A. H. GARSIDE, New Bedford, Mass.
DONALD M. GILES, Amsterdam, N. Y.
DARIUS L. GOFF, Pawtucket, R. I.
W. J. GRISWOLD, Durham, N. C.
P. LEROY HARWOOD, New London, Conn.
CHARLES W. HAWKES, Boston, Mass.
JOHN S. HENDERSON, Jr., Boston, Mass.
E. W. HITCHCOCK, New York, N. Y.
J. C. HOWE, Boston, Mass.
JOHN HUMPHREY, Sec'y Business Men's Ass'n, New London, Conn.
ROBERT S. IREMONGER, Harrison, N. J.
H. K. JACKSON, Woonsocket, R. I.
MITCHELL JOHNSON, Boston, Mass.
FRANK J. KING, Norwich, Conn.
E. B. KITCHELL, South Orange, N. J.
EDWARD LEONARD, Pawtucket, R. I.
KENNETH H. LEWIS, Boston, Mass.
HENRY G. LORD, Boston, Mass.
GEORGE H. LUMB, Pawtucket, R. I.
E. T. LYLE, Boston, Mass.
R. W. MACKAY, Readville, Mass.
BRYAN F. MAHAN, Mayor, New London, Conn.
D. P. MAHON, Boston, Mass.
FRED E. MANN, Boston, Mass.
JOHN W. MAYN, Providence, R. I.
T. H. MEEK, East Douglas, Mass.
ROBERT W. MERRIAM, Middletown, Conn.
M. A. METCALF, Boston, Mass.
GEORGE B. MITCHELL, Pittsburgh, Pa.
SPENCER MONTGOMERY, Windsor Locks, Conn.
G. DENNIE MOONE, Providence, R. I.
W. L. MORRIS, Fort Wayne, Ind.

TIMOTHY C. MURPHY, Mayor, Norwich, Conn.
FRANK L. NAGLE, Boston, Mass.
E. W. NEWCOMB, Boston, Mass.
J. NEWINGTON, Boston, Mass.
M. H. NEWMAN, Cleveland, Ohio.
C. H. OCHS, New York, N. Y.
RANDOLPH T. ODE, Providence, R. I.
E. E. PALMER, Boston, Mass.
H. M. PARKS, Fitchburg, Mass.
W. S. PEPPERELL, Providence, R. I.
FRANK B. PERRY, Newton Center, Mass.
JOHN PORTEOUS, Plainfield, Conn.
HOWARD S. REED, Los Angeles, Cal.
GEORGE E. RICHARDSON, Boston, Mass.
O. W. ROBINSON, Boston, Mass.
M. V. ROOF, Jr., New York, N. Y.
J. L. SANFORD, Providence, R. I.
WALLACE A. SHAMBOW, Woonsocket, R. I.
AUGUSTUS B. SMITH, Glen Ridge, N. J.
E. L. SMITH, Boston, Mass.
JOSEPH J. SMITH, Boston, Mass.
LEONARD W. SMITH, Pawtucket, R. I.
R. A. SMITH, Norwich, Conn.
W. WOOD SMITH, Readville, Mass.
S. H. STEELE, Philadelphia, Pa.
H. C. STEVENS, Boston, Mass.
WILLIAM J. STEWART, Webster, Mass.
JOHN D. STREET, Medford, Mass.
ALANSON THAYER, Providence, R. I.
W. P. THOMPSON, Providence, R. I.
CHARLES F. TILLINGHAST, Providence, R. I.
CHARLES R. TOWSON, New York, N. Y.
H. N. TRUMBULL, Hartford, Conn.
C. F. UNDERWOOD, Philadelphia, Pa.
GEORGE A. VAUGHAN, Jr., Putnam, Conn.
EARLE T. WALKER, Providence, R. I.
A. S. WATTLES, Canton, Mass.
R. E. WATTLES, Canton, Mass.
A. B. WEBB, Norwich, Conn.

PHILIP T. WELLES, Norwich, Conn.
PHILIP C. WENTWORTH, Hopedale, Mass.
FRANK L. WHEELER, Shelton, Conn.
WILLIAM W. WHEELER, Meriden, Conn.
A. T. WHITE, Winchendon, Mass.
CHARLES D. WHITE, Winchendon, Mass.
JOHN H. WHITE, Winchendon, Mass.
K. B. WHITE, Winchendon, Mass.
Z. L. WHITE, Winchendon, Mass.
A. R. YOUNG, Jewett City, Conn.

Miss SALLIE M. AYER, Easthampton, Mass.
Mrs. DAY BAKER, Boston, Mass.
Mrs. JOEL M. BARNES, Boston, Mass.
Miss J. A. BAXTER, Somerville, Mass.
Mrs. A. E. BENNERS, Philadelphia, Pa.
Miss HELEN M. BENNERS, Philadelphia, Pa.
Mrs. FREDERICK H. BISHOP, Boston, Mass.
Mrs. W. IRVING BULLARD, Danielson, Conn.
Mrs. S. R. BURNAP, Windsor Locks, Conn.
Mrs. JAMES E. COBURN, Lewiston, Me.
Mrs. JAMES A. COOPER, Whitinsville, Mass.
Mrs. FRANCIS W. DEAN, Boston, Mass.
Mrs. FRANK J. DUTCHER, Hopedale, Mass.
Mrs. JESSE P. EDDY, Providence, R. I.
Mrs. WILLIAM FIRTH, Boston, Mass.
Mrs. E. T. FOWLER, Westfield, Mass.
Mrs. JOHN H. GILES, Amsterdam, N. Y.
Mrs. LYMAN B. GOFF, Pawtucket, R. I.
Mrs. EDWIN FARNHAM GREENE, Boston, Mass.
Mrs. S. HAROLD GREENE, Boston, Mass.
Mrs. ARTHUR H. GULLIVER, Norwich, Conn.
Miss BESSIE W. HANCE, Philadelphia, Pa.
Miss MARGARET HARRIS, Glen Ridge, N. J.
Mrs. P. LEROY HARWOOD, New London, Conn.
Mrs. J. FRED HAVEY, Lowell, Mass.
Mrs. JOHN HILL, Atlanta, Ga.
Mrs. CHARLES E. Hodges, Boston, Mass.

Mrs. J. Rawson Hughes, Waterbury, Conn.
Mrs. Frank B. Kenny, Lowell, Mass.
Mrs. Fred Lacey, Lowell, Mass.
Mrs. Harold Lawton, Plainfield, Conn.
Mrs. William H. Loftus, Newark, N. J.
Mrs. E. T. Lyle, Boston, Mass.
Mrs. J. Irvine Lyle, New York.
Mrs. Fred E. Mann, Boston, Mass.
Mrs. Allan McNab, Jr., Boston, Mass.
Mrs. J. R. Montgomery, Windsor Locks, Conn.
Mrs. W. L. Morris, Fort Wayne, Ind.
Mrs. Charles M. Mumford, Newton Centre, Mass.
Mrs. W. C. Murphy, Providence, R. I.
Mrs. Walter T. Phipps, Providence, R. I.
Mrs. Frank W. Reynolds, Boston, Mass.
Mrs. Ray M. Sanford, Westfield, Mass.
Mrs. Albion K. Searls, Northbridge, Mass.
Mrs. Christopher J. Shambow, Woonsocket, R. I.
Mrs. Charles P. Slocum, Boston, Mass.
Mrs. Harry M. Smith, Providence, R. I.
Miss Marie Smith, Glen Ridge, N. J.
Mrs. W. H. Smith, Pawtucket, R. I.
Mrs. Henry B. Sprague, Lynn, Mass.
Miss Ethel Stewart, Webster, Mass.
Mrs. Wallace I. Stimpson, Hopedale, Mass.
Mrs. Edward W. Thomas, Lowell, Mass.
Mrs. James P. Tolman, West Newton, Mass.
Mrs. Charles F. Tillinghast, Providence, R. I.
Mrs. Charles R. Towson, New York, N. Y.
Mrs. George A. Vaughan, Putnam, Conn.
Mrs. Albert Walton, Boston, Mass.
Mrs. A. S. Wattles, Canton, Mass.
Mrs. Alexander S. West, Providence, R. I.
Miss Alice P. Woodbury, Lynn, Mass.
Mrs. C. J. H. Woodbury, Lynn, Mass.
Miss Laura B. Woodbury, Lynn, Mass.
Miss Louise Woodbury, Lynn, Mass.

FIRST SESSION.

MONDAY EVENING, SEPTEMBER 9, 1912.

The Association met in the ballroom of The Griswold, New London, Conn., at 8.15 P. M., the President, Mr. EDWIN FARNHAM GREENE, in the chair.

The PRESIDENT. Will the ninety-third meeting of The National Association of Cotton Manufacturers please come to order. The Secretary will read the call for the meeting.

The Secretary read the call, as follows:

BOSTON, MASS., August 3, 1912.

To the Members:

Notice is hereby given that the semi-annual meeting, No. 93, of this Association will be held at The Griswold, near New London, Conn., Monday, Tuesday and Wednesday, September 9-11, 1912.

The sessions will be held in the ballroom of the hotel, beginning at 8.15 P. M., Monday, September 9, on which occasion, His Excellency, SIMEON E. BALDWIN, LL. D., Governor of Connecticut, and His Honor, BRYAN F. MAHAN, Mayor of New London, Conn., will give addresses of welcome to the state and city, and President EDWIN FARNHAM GREENE

will give his address, after which, with the Governor, he will informally receive the members and ladies.

On Tuesday and Wednesday the sessions will be held at 10 A. M. and 8.15 P. M.

By order of the Board of Government,

Respectfully submitted,

C. J. H. WOODBURY,

Secretary.

On account of the numerous contingencies governing the program, both as to changes in titles of papers and additional papers to be added later, the full program will not be issued until shortly before the meeting, but advance copies of any papers will be sent to the members on request if they are printed in time.

The following papers are expected:

California Long Staple Cotton District.
Cauto Cotton of Cuba.
Cotton Growing in India.
Dust-proof and Waterproof Mill Flooring.
Economic Use of Lubricating Oils.
Humidifiers and Their Results.
Importation of Skilled Labor.
International Tariff Relations.
Lithographic Process of Calico Printing.
New England Terms for Buying and Selling American Cotton.
Present Day Relations between the Foreign-born Operative and the Mill Management.
Reports of Committees.
Selection of Sites of Cotton Mills.
Workmen's Compensation Laws in the United States.
Young Men's Christian Association in Industry.

The Committee on Meeting, wearing white badges, consists of Messrs. GROSVENOR ELY, *Chairman;* GEORGE S. BARNUM, E. S. BOSS, W. IRVING BULLARD, JOHN ECCLES, R. H. I. GODDARD, Jr., JOHN E. KENDRICK,

HAROLD LAWTON, JAMES R. MACCOLL, JOSEPH MERRIAM, J. R. MONTGOMERY, WALTER T. PHIPPS and HAROLD C. WHITMAN.

The Committee on Meeting will have general charge of the sessions and also of the golf trophies offered by the Board of Government and the prizes for tennis, baseball, and some other sports, offered by various parties. Any persons playing outside of the afternoons upon which the contests will be held will be disqualified. The program will contain further detailed information upon these recreations, which are informal and do not constitute any portion of the meeting of the Association.

The Committee on Resolutions consists of Messrs. FRANKLIN W. HOBBS, *Chairman;* WILLIAM M. BUTLER, FREDERICK A. FLATHER, LYMAN B. GOFF, S. HAROLD GREENE, GEORGE M. MONTGOMERY, W. FRANK SHOVE and RIDLEY WATTS, to which committee all resolutions are automatically referred, whether personally sent or submitted at one of the sessions.

TRANSPORTATION.

As New London is in a central position reached by railroads from a number of different directions, it has not been feasible to make arrangements for a special train, and members will make their own arrangements, buying tickets and checking baggage for New London, Conn. The porters of The Griswold will meet all trains. Checks may be given to them, and it is suggested that every trunk should be marked with the name of the owner and destination.

Special boats for The Griswold may be taken opposite the railroad station, and during this meeting boats will be run as rapidly as possible to give accommodations to members.

Those coming to The Griswold by automobile from the west of the river will cross the ferry at New London, turn in a southerly direction, and follow the trolley tracks as far as the drinking fountain, thence taking the right-hand road to The Griswold.

THE GRISWOLD.

The Griswold is situated on the easterly side of the Thames River, about two miles south of the railroad station in New London, Conn., which is on the westerly side of the river. Although hotels have been on or about this site, of rare scenic beauty, for over sixty years, yet the present hotel is a new building, equipped with all the conveniences

of a first-class modern hotel. The postoffice, telegraph, and long distance telephone address is care of The Griswold, New London, Conn.

Members should write in advance to H. D. SAXTON, Manager, The Griswold, stating what accommodations are desired, and the time of their arrival, and rooms will be reserved accordingly. The rates during this meeting have been reduced to $5 per day for each person and $2 extra per day for each bathroom attached to the rooms. The hotel will be closed on Thursday after this meeting.

The equipments of the hotel are complete in every respect. There is a long distance telephone in every room. The table is first-class, and in part rendered so by the Branford farms, about half a mile from the hotel, furnishing fresh vegetables, milk, eggs and poultry. Those interested in the subject will find pleasure in visiting this farm, especially its herd of pure bred cattle, costing over $100,000.

In connection with the hotel is a physician, apothecary shop, grill room, and barber shop; while in the courtyard of the hotel are three tennis courts and on the easterly side of the grounds an athletic field for baseball, and near by is the Shennecosset Club golf course, whose links will be at the service of members desiring to play. The garage has accommodations for a large number of cars, and automobiles can be hired for trips.

On the Long Island side of Eastern Point is a beach for bathing in Long Island Sound. The hotel pier in front of the house is sheltered by a natural breakwater, and the river affords fine sailing and both power boats and sail boats can be secured, but arrangements should be made in advance at the hotel desk. Lines of steamers and power boats, for which schedules can be obtained at the hotel desk, run from piers at New London up the river to Norwich, and also cross Long Island Sound to Fisher's Island, Sag Harbor and Montauk, and to Crescent Beach; also from New London easterly to Watch Hill and Block Island.

The Norwich Golf Club on the westerly side of the river, about ten miles north of New London, has an attractive and well furnished club house, to which members may obtain the cards necessary for admittance from the chairman of the Committee on Meeting.

EASTERN POINT.

This territory is one of the most interesting portions of the southern New England coast. It was first explored by Captain ADRIAN BLOCK, the Dutch navigator, in 1614, and about ten years later, contentions

began between the Dutch from New Amsterdam and the Puritans from the colony of Massachusetts Bay to obtain the control of this territory, and each of these were vigorously opposed by the Indians, with whom was waged a continual warfare by the settlers.

American industries were established at an early day throughout this colony, as the destitute conditions of England prevented the mother country from furnishing the help which the early colonists desired. The domestic handicrafts of spinning and weaving of cotton, which was obtained largely from the Island of Barbadoes, were practiced about a generation before these processes were known in England. The settlers took up with the reeling and weaving of silk, and mulberry trees were planted all over the state.

When JOHN WINTHROP was Governor of the Colony of Massachusetts Bay, he encouraged the settlers to develop water powers in each of the settlements for the grinding of grain, which was afterward made into spinning mills by the addition of a second story of wood. All of these have been burned, and his son, JOHN WINTHROP, Jr., Governor of Connecticut, had a grain mill built by JOHN ELDERKIN of Lynn, the millwright of Massachusetts Colony, in 1650, and this, the only one of these early mills known to be standing, is in New London, at the head of Mill street, near Main street, and still in use, owned by the City of New London.

The deep waters of the Thames River, furnishing a sheltered harbor, accessible at all stages of the tide, made this town one of the earliest of the mercantile towns of New England. During the Revolution, it was the scene of a notable battle, when a British fleet under BENEDICT ARNOLD, who was born at Norwich, a few miles up the river, attacked the two forts guarding these waters, September 6, 1781, two divisions of the British troops of about 800 each landing simultaneously on opposite sides of the river and proceeding northward. The party on the west side attacked and captured the present Fort Trumbull, and the troops on the easterly side of the river landed at about the site of The Griswold, and attacked Fort Griswold, about three miles to the north, which spot is marked by a high monument, which shares with Bunker Hill Monument the distinction of being the only two memorials of this nature ever erected on a battle field by the defeated party.

After the battle, the British troops sacked the storehouses of the merchants, which contained a large amount of merchandise, and burned the town.

During the War of 1812, privateers made this river a rendezvous, and some United States vessels were kept blockaded for twenty-one months by British ships of greater armament. It was into this harbor that Commodore DECATUR brought the "Macedonian," which he had captured three months earlier.

Notwithstanding the activities of the people of Connecticut during the War of 1812, it is stated that there was no casualty on its soil, and the only Connecticut man who was killed fell beyond the borders of the state.

MEMBERSHIP.

It is trusted that the members will co-operate to the advantage of the Association in broadening its membership so that it may be as fully representative as possible of those engaged in the cotton manufacturing business and its tributary occupations, by calling to the attention of such persons the advantages of membership in the organization.

It is desired that applications for membership shall be received as far as possible in advance of the meeting.

A blank proposition for membership is enclosed for convenience in submitting the names of any who would be desirable members. Many persons have not become members because they have not been invited. Candidates for membership will receive the same privileges at the meeting as the members. Blank propositions are also inside the front cover of the Transactions, or will be sent on application.

Any member can become a life member on payment of $100.

CHANGES OF ADDRESS.

Members will please inform the Association of changes in position or address in order that they may receive their copies of the Transactions or notices of meetings.

Statements for such dues for the fiscal year beginning April 1, 1912, as still remain unpaid are enclosed herewith and it is hoped that they will receive early attention.

ASSOCIATION SCHOLARSHIP.

The Association Scholarship at the New Bedford Textile School, founded on the gift of WILLIAM FIRTH, Esq., has become vacant this year, and applications of candidates, preferably the son of a present or former member, should be made in writing to the Secretary of this

Lithographic Process of Calico Printing.

J. A. JEFFERSON HAYES, Hayes (Universal) Printing Machinery, Ltd., Works Road, Letchworth, Hertsfordshire, England.

Third Session, Tuesday, September 10, 1912, at 8.15 P. M.

Importation of Skilled Labor.

W. H. SMITH, Supt. American Textile Co., 625 East Ave., Pawtucket, R. I.

Present Day Relations between the Foreign-born Operative and the Mill Management.

ARTHUR H. GULLIVER, 30 Huntington Lane, Norwich, Conn.

Workmen's Compensation Laws in the United States.

CHARLES E. HODGES, Treas. American Mutual Liability Insurance Co., 50 State St., Boston, Mass.

The Young Men's Christian Association in Industry.

CHARLES R. TOWSON, Secretary of the International Committee, 124 East Twenty-eighth Street, New York City.

Fourth Session, Wednesday, September 11, 1912, at 10 A. M.

Economic Use of Lubricating Oils.

DAVID A. COREY, S. F. Bowser & Co., Inc., Fort Wayne, Ind.

Selection of Sites for Cotton Mills.

ALBERT L. SCOTT, Treas. Lockwood, Greene & Co., 60 Federal St., Boston, Mass.

Humidifiers and their Results.

FREDERICK W. PARKS, Prest. The G. M. Parks Co., Fitchburg, Mass.

Report of the Committee on Resolutions.

FRANKLIN W. HOBBS, Chairman.

The Committee on Resolutions consists of Messrs. FRANKLIN W. HOBBS, *Chairman;* WILLIAM M. BUTLER, FREDERICK A. FLATHER,

INFORMAL RECEPTION.

After the exercises, the President, the Governor, and the Mayor will informally receive the members and guests, which will be followed by a promenade concert and dancing.

It is sincerely hoped that none of the members or the guests will refrain from attendance at the reception, as this occasion is designed to bring the members socially together.

The guests of The Griswold are cordially welcome at all of the sessions.

The Committee on Meeting, wearing white badges, consists of Messrs. GROSVENOR ELY, *Chairman;* GEORGE S. BARNUM, E. S. BOSS, W. IRVING BULLARD, JOHN ECCLES, R. H. I. GODDARD, Jr., JOHN E. KENDRICK, HAROLD LAWTON, JAMES R. MACCOLL, JOSEPH MERRIAM, J. R. MONTGOMERY, WALTER T. PHIPPS and HAROLD C. WHITMAN.

The Committee on Meeting will have general charge of the sessions, and also the recreations when the Association is not in session.

BADGES.

The badge pins will be given to members and their guests at the time of registration.

The vignette on the badge pin represents the New London Town Mill, still in operation, built in 1650 for JOHN WINTHROP, Jr., Governor of Connecticut, by JOHN ELDERKIN of Lynn, the millwright who built twenty-eight grist mills before that time for JOHN WINTHROP, Sr., Governor of the Colony of Massachusetts Bay, none of which are now standing.

Second Session, Tuesday, September 10, 1912, at 10 A. M.

Business.

International Tariff Relations.

SAMUEL GUYTON MCLENDON, B. L., 321 Kimball House, Atlanta, Ga.

Dust-proof and Water-proof Mill Flooring.

S. W. FLESHEIM, Secretary, The Master Builders Co., Cleveland, Ohio.

The above games are for the recreation of the members and their guests and do not form any portion of the official proceedings of the Association.

Excursions.

Points of interest near the hotel are: the tennis courts in the court-yard; the Athletic Field; the Shennecosset Club golf course; the Branford Farms, all to the east of the hotel; and the bathing beach on Long Island Sound, about one-quarter of a mile south of the hotel.

The hotel pier in front of the house is sheltered by a natural breakwater, and the river affords fine sailing and both power boats and sail boats can be secured, but arrangements should be made in advance at the hotel desk. Lines of steamers and power boats, for which schedules can be obtained at the hotel desk, run from piers at New London up the river to Norwich, and also cross Long Island Sound to Fisher's Island, Sag Harbor and Montauk, and to Crescent Beach; also from New London easterly to Watch Hill and Block Island.

In New London, the old town mill represented on the badge of this meeting, is situated at the head of Mill street, near Main street, and is still in operation. It is owned by the City of New London, and with its adjoining mill pond is under the charge of the Park Commissioners. It is distant about one-half a mile from the railroad station, and can be reached by going up State street to Main street, which is the second street on the right, and taking either a Norwich or a Post Hill street car.

Washington's headquarters, now the New London County Historical Society, on Bank street, about one-half a mile from the station, reached by an Ocean Beach car, contains an extensive historical collection, which can be visited by the members.

The Norwich Golf Club on the westerly side of the river, about ten miles north of New London, has an attractive and well-furnished club house, to which members may obtain the cards necessary for admittance from the chairman of the Committee on Meeting.

Special boats for The Griswold may be taken opposite the railroad station, and during this meeting boats will be run as rapidly as possible between New London and The Griswold to give accommodations to members.

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INTERNATIONAL FEDERATION OF MASTER COTTON SPINNERS' AND MANUFACTURERS' ASSOCIATIONS.

The Association has a limited number of the proceedings of the meetings of the International Federation of Master Cotton Spinners' and Manufacturers' Associations, and a few copies of the records of the conference of Cotton Growers and Manufacturers, held at Atlanta in 1907, which will be given to members upon application.

The SECRETARY. Mr. President, I certify that I mailed a copy of this notice to every member of the Association at least ten days before this meeting, in accordance with Article 16 of the by-laws, and that a quorum is now present qualified to act on any business which may legally come before this meeting.

The records of the last meeting were read by the Secretary, and on motion of Mr. DANIEL MOORE BATES the same were accepted.

The Secretary gave several notices as to the arrangements for the entertainment of members and guests, and stated that Mr. C. B. BRYANT, Secretary of the American Cotton Manufacturers' Association, had sent his sincere regrets at his inability to carry out his intended purpose of being present at this meeting.

The PRESIDENT. We are honored this evening by the presence of the Governor of this state, who will give an address of welcome to the state, and it gives me a great deal of pleasure at this time to introduce His Excellency SIMEON E. BALDWIN, Governor of Connecticut. [Applause.]

ADDRESS OF WELCOME TO THE STATE.

His Excellency, SIMEON E. BALDWIN, LL.D., Governor of Connecticut, New Haven, Conn.

Mr. President, Ladies and Gentlemen: Connecticut is honored by this gathering upon her soil.

The various national associations which meet, now in one state and now in another, play no unimportant part in the development of the American people. They help to keep us one people. They help to make the men of each part of the country know something personally of the men of every other part. They introduce every member to others who are specially interested in the things that he is also specially interested in. They stimulate investigation and discussion. They furnish a place where questions of practical politics can be examined without much reference to party platforms. I note among the subjects you are to consider are the tariff; the existing relations between foreign laborers and mill management; and workmen's compensation laws. These are present-day matters. The whole people are talking about them, and will listen with eager ears to what you have to say. They will be disappointed if you do not treat these questions broadly, and go to the bottom of what underlies them all.

These are days of quickened popular thought; of elevated popular aspirations; of insistent popular demands. The whole world feels a new spirit of inquiry. It is looking for something new, in the way of public betterment — of the betterment of those who need it most. It is looking for the erection of higher

standards of business morals, and of political morals. It sees them already rising.

The wise man does not content himself with opposing tumultuary and unreasoning currents of popular emotion, if such there are. He knows that there must be something underlying them of real significance. His part is to find out what these underlying forces are.

So you, who represent one class of the capitalists of American society, will look at these labor problems and tariff problems. You represent more than the capital invested in your mills; more than the thousands of your stockholders and bondholders. You represent a greater number of thousands who are your fellow-laborers, the wage-earners whose pay you provide, and whose interests are in large measure in your keeping.

You have, also, vital relations with the whole American people. You cannot deal with the tariff, without thinking both of what the manufacturer gets out of it, and of those out of whom he gets it.

We have got to look at these questions from all sides, if we would do justice to the inquiry; and in the long run it is justice which will be done.

In this state we are examining this question of workingmen's compensation with care by a commission, one of whose members is a member of your Association and is in this assembly, and I venture to say that the results of the work of the commission of which he is a member, when reported next year to the next General Assembly of Connecticut, will be of vital interest to all who are pondering these problems of workingmen's compensation and workingmen's insurance.

We welcome the Association to the state where ELI WHITNEY lived, and from whence he went to create by his invention of the cotton gin the great agricultural industry of the South; the state also to which ELI WHITNEY returned to set up at Whitneyville, a few miles from New Haven, a hundred years ago, the first systematic attempt to bring out interchangeable parts in instruments of precision. In that field WHITNEY led the way

as he did in his cotton gin. WHITNEY'S arms, his rifles and muskets, which he made more than a hundred years ago at Whitneyville Armory, were on that principle of interchangeable parts, introduced by him into this country.

We welcome you to a manufacturing state, in which her waters were early turned into factory power, though she has long had to supplement or replace them by coal from distant states.

We welcome you to a state whose population is increasing faster than that, on the average, of the rest of the United States, and increasing because there is hardly a town without a factory.

Connecticut has passed, since the days of the Revolution, from an agricultural state to a manufacturing state.

The United States, as a whole, are moving in the same direction. The cotton factories of the South are becoming almost as important as those of the North. The farming states are growing more slowly than the manufacturing ones or, like Iowa, are growing less.

It is the law of modern life that the richest returns are from those things into which human labor enters most fully. Man is greater than his surroundings, greater than the soil he stands on. If the farmer, as time goes on, is more and more to yield his pre-eminence to the artisan, so much the greater is the task of those concerned, like you, in directing the artisan; so much the nobler the reward of directing him in paths of happiness and prosperity. [Applause.]

The PRESIDENT. We all of us associate The Griswold with the city of New London, and we are fortunate also in having with us this evening the Mayor of New London. It gives me a great deal of pleasure to introduce at this time His Honor, BRYAN F. MAHAN, Mayor of New London, who will address us with words of welcome. [Applause.]

ADDRESS OF WELCOME TO THE CITY OF NEW LONDON.

His Honor, BRYAN F. MAHAN, Mayor of the City of New London.

Mr. President, Ladies and Gentlemen : — It is a great honor as well as a great pleasure for me in behalf of the city of New London to extend to you, the members of one of the oldest manufacturing organizations in the the world, a very hearty and cordial welcome to the city. We feel honored by your presence here and I know that I express the hearty wish of every member of our city government that you will enjoy your stay here, every hour of the day and night, that your work here will be productive of good results and that you will go away with the satisfaction of knowing that your session here has been not only beneficial to your organization but pleasant and profitable to each and every one of you individually.

His Excellency, the Governor has covered the ground so well in his very able address that I scarcely know what to say to you at this time. Perhaps the memory of a very interesting event which took place here last week and which made a deep impression upon me will be my excuse for referring to the subject-matter of that convention, the Atlantic Intra-Coastal Deeper Waterways Association. And I refer to it because I believe that the question of transportation is one of the most important things that can be brought to the attention of gentlemen engaged in the business that you follow.

But a minute ago I was talking with one of the officers of this Association who employs 7,000 hands on the banks of the Merrimac River, and it was agreed between us that if the government did its duty and should do for the Merrimac River what the hustling western statesmen have persuaded it to do

for their rivers, from the saving to his company in the cost of transportation of coal alone he could give every employee of his company, 7,000 people, a week's vacation with pay. Now, gentlemen, just imagine the saving on the cost of the transportation of the raw material in bulk and the finished product brought down for distribution to the various cities of this country and abroad.

We in Connecticut have just waked up to the importance of water communication, and I am very happy to say that under the guidance and with the advice and consent of His Excellency the Governor, Connecticut has taken a step, keeping in pace with the Commonwealth of Massachusetts, which has appropriated nine millions of dollars to develop the harbor of Boston, while Connecticut has appropriated one million of dollars to develop the harbor of New London.

Along the Atlantic Coast, we have more than 150 rivers and 10,000 miles of rivers which might be open to navigation. I want you to stop and think of the enormous saving of money and the great benefit that it would be, not only to the manufacturers, but to the farmers of this country, if the cotton could be brought from the Southern States in bulk and delivered without breaking cargo to your manufacturing establishments and your finished articles sent forth in the same way.

Gentlemen, I am not here to tell you how to make money; I simply offer that as a suggestion, because the impression made upon me by the recent convention was so strong that I could not resist the temptation.

In the Governor's address, he referred to the condition of the people employed in the various manufacturing lines. I am very happy to say from personal observation that the condition of the employees of the textile manufacturing establishments, certainly in the eastern part of Connecticut, has very materially improved. Nearly thirty years ago I was in the city of Norwich, walking with a brother of Norwich's honored mayor, whom I have the pleasure of seeing here tonight. Turning a corner, we ran into a dozen little tots of children about twelve

or thirteen years of age, scantily clothed and generally with an impoverished appearance. I asked my friend, "For heaven's sake, where did those children come from?" He told me they came from a mill more than a mile from where we were then walking. And I said, "What are they doing at this hour of the night?" He said, "Why, they go to work at six in the morning and they work until six at night, with a half hour for nooning. You ought to do something if you get the opportunity to help those poor children." It had been my good fortune to serve a term in the Legislature and I immediately promised if I ever had the opportunity I would see what could be done. I was returned to the Legislature, and having that matter in mind, thought it best to inquire into the physical condition of the employees of some of the mills. Without naming the town, I went one night and put up in a factory boarding-house. With the first bell in the morning — it seemed to me about midnight, but it was between four and five — I arose and went down through the streets of that factory village to the mill and meeting there a night watchman I had quite a lengthy conversation with him and he took me into some of the houses. There on the floor were beds of straw, where the father, the mother and the children were housed in one room. The employees were brought here under contract; they were actually of the lowest order of the human species I ever saw in my life. That was thirty years ago. The hours of labor then were 12 and 12½ hours a day; now I believe they are 56 hours a week.

And I want to say to you that the condition of your operatives in the textile industries today in the eastern part of this state is very much better than that of the average person who works for a living. They are better housed, more care is taken as to sanitary conditions, their rent is cheaper. I think they are in the best condition of any employees I know of in any class of industry in this country. So you see there has been a marked improvement in the physical and financial condition and the health of the employees of the manufacturing institutions in the cities of this state.

In conclusion, gentlemen, I want to say that just across the river we have what we believe to be a very pretty city. We know something about your business. We have one of the largest textile manufacturing establishments in Connecticut doing business in New London. I sincerely hope that you will have the opportunity and the disposition to visit us. Come and look us over. You will see one of the prettiest, tidiest little towns in New England. And whatever we are lacking I assure you we propose to go forward and correct it so as to make it pleasant. In a very short time — in a year or so, (turning to Governor BALDWIN) Governor, — we expect to have the opening of the Women's College.

Governor BALDWIN. We hope so.

Mayor MAHAN. Perhaps it would not be amiss to tell you the story about our getting that college. A year ago last March there was a meeting of some ladies in the city of Hartford, graduates of colleges, who were regretting that Wesleyan College had decided to give up the education of women, and they started a movement for a Women's College in Connecticut. The result of that was a ten days' campaign in New London in which we raised $135,000 for that college. Today that college has the possession of a great tract of land and a million of money, the princely gift of one of the finest men that ever lived, the owner of this beautiful property in which you are now holding your convention, — Mr. MORTON F. PLANT. So that we feel that in a very short time New London will have an additional charm for the stranger in being a college town.

The people of New London are warm-hearted, brave and generous and will be delighted to see you there and to have you make the town your own. I feel that I am voicing this sentiment in saying to you that the city of New London is yours, that you will be welcome to do with the city as you please. [Applause.]

The PRESIDENT. Mr. FRANKLIN W. HOBBS, a former president of this Association, will reply to these addresses of welcome. Mr. HOBBS. [Applause.]

REPLY TO ADDRESSES OF WELCOME.

FRANKLIN W. HOBBS, Boston, Mass.

It is a pleasure and a privilege to me to respond in behalf of our Association to the kind words of welcome from His Honor the Mayor of New London, and from His Excellency the Governor of Connecticut.

We are glad to be here in this interesting spot, beautiful in its natural attractions and rich with historical associations. But as has been said, we are here primarily to discuss present day matters; and these problems can be solved best by meeting face to face, by learning each other's view points, and by this means getting a fuller comprehension of the subjects in all their aspects. These same remarks apply also to the great national questions which are now agitating the nation from one end to the other, and I believe if these problems are carefully and thoroughly discussed and understood the verdict of the people will be right now, as it always has been in the past.

The Governor naturally called attention to the fact that in this state ELI WHITNEY lived. It is a pleasure to recall here that this Association placed a bronze tablet to his memory on the walls of the corridor of the Richmond County Court House at Augusta, Georgia, a few miles from the spot where WHITNEY'S cotton gin was first put into practical operation.

I must take issue with His Excellency on one point, and that is his statement, — somewhat qualified, I admit, — that we "represent one class of the capitalists of American society"; for, as I pointed out in an address before this Association a year ago, "the stockholders are composed largely of widows

and orphans whose small holdings represent the savings of a lifetime and of people who by thrift and economy have saved a little money and invested it in the local mill, upon the success of which depends the very existence of the community in which it runs. The great number of stockholders in these enterprises indicates that capital is a collective noun as much as labor, and it is a well known fact that many names on the pay roll also appear on the stock ledger of the same corporation." It was further shown that 55 per centum of all the stockholders were women or trustees and that the average holding per stockholder was only thirty-eight shares of a par value of $100, a great contrast to the existing popular opinion that the ownership of the textile mills is in the hands of the wealthy few.

You are right, sir, in calling attention to the fact that we represent not only the stockholders but also the employees, with whom most of us, at any rate, are numbered. The competent manager appreciates fully his responsibilities to the stockholders and realizes he is acting as a trustee in their interest; but he none the less appreciates and realizes that in all reasonable ways he must also consider and take care of the interests of the operatives. The stockholders, the operatives and the executive must all work for the common end and all must rise or fall together. That is the true spirit of the times and the secret of real and lasting success in any enterprise.

We hear a great deal of a critical nature about trusts and combinations nowadays, and without discussing whether they are a good thing for the country or not, it is a fact that the cotton manufacture is one of the industries in the country which is without combinations, each establishment being independent and carrying on its own business in its own way. There is no opportunity for the Sherman law to get in its dissolutions in this industry and thereby raise the price of the various products of the cotton manufacture! [Laughter.]

It is true that we represent the capital invested in cotton manufacturing but, with the exception of a very few who are members of cotton manufacturing firms, we represent it in the

same manner as the most primitive type of laborer, and that is as hired men with the responsibility of faithfully attending to the duties imposed upon us.

Practically all the members of this Association have advanced to positions of larger responsibility through many years of service in smaller fields of work in the same business, where were learned the various practical details pertaining to cotton manufacturing, whether they were mechanical propositions, the knowledge of raw material and goods, or the great commercial problems which are an essential part in the success of our industry.

NAPOLEON made the axiom, at a time when officers had been recruited entirely from the nobility, that "every private carried a marshal's bâton in his knapsack," and through the *esprit de corps* which that principle established, his armies won victories over greater numbers of unwilling conscripts. And in like manner, the history of the leaders in the cotton manufacturing industry shows that they were recruited from those whose early life was that of small beginnings in the cotton industry, and in these rewards to intelligence, fidelity and industry which fate has vouchsafed in the past, the history of the future may confidently be expected to repeat itself.

I am sure that you have all been interested in the remarks of the Mayor of New London with reference to the recent Waterways Congress. We have heard on the Merrimac for many years about making Lawrence a seaport, and I am afraid I have not been sufficiently visionary to realize that the fulfillment of the dream was so near at hand as my friend the Mayor suggests. But if it is we shall certainly welcome it, and I hope that the deliberations of the convention to which he has referred will soon bear fruit such as we would all like to see.

It was also very interesting to hear his comments with reference to the great improvement in the condition of the people who are working in our industry. It is a great pleasure, and a somewhat rare one, to find a public official who has taken the trouble to get at the facts in this matter. We who are in the

business know, of course, how greatly improved in every way has been the condition of the operatives in our industry, but I say it is a rare pleasure to find a public official who has really gone into the matter on his own account and who publicly states what we know so well to be true.

A speech is not expected from me and I am afraid I have talked too much already. I will simply say that we are glad to be here, gentlemen, in this delightful place and amid these charming surroundings, and I trust that we may so combine business and pleasure, real work and social enjoyments, that we may profit by our meeting in every way and return again to our homes mentally and physically refreshed for the winter's work. [Applause.]

PRESIDENT'S ADDRESS.

EDWIN FARNHAM GREENE, Boston, Mass.

This is the first opportunity that I have had to publicly express my appreciation of the honor which you have bestowed upon me in electing me President of this Association. I regret very much that at the time of the April meeting I was detained in Washington on important business.

If you will pardon a few personal words, — many of you know that I have a very deep interest in the work of this Association for many reasons. In the first place, my family has now for three generations been closely identified with the cotton manufacturing industry. My grandfather, starting as a carder, worked up to the position of superintendent of the White Rock Mills in Rhode Island, and my father prepared for Brown University while serving as an overseer in a cotton mill, and throughout his life was closely identified with the industry. From my early boyhood days the name of The New England Cotton Manufacturers' Association was a familiar one. It was therefore with peculiar pleasure that I accepted the election and consider it an honor which I cherish above most things that can come to a cotton manufacturer.

I shall not attempt at this time to give any resumé of events in the industry during the past few months, as I should like to devote what time I have on this occasion to the simple presentation of two subjects which I consider to be of very great importance in view of the conditions which we find surrounding us at the present moment.

First, — The general relation of the employer to employee,

and second,—The effect of politics and the tariff on our industry.

In considering this most important subject of the relationship of employer and employee, I do not expect to add anything original at this time, but merely wish to call your earnest attention to the present conditions and suggest, if possible, certain lines of thought for us employers to consider with the hope that in arousing interest in this subject and directing your attention to a more careful study of these problems, the industry and the community will be freed, to a degree at least, from the serious troubles which seem to beset us in this year 1912.

We have for the past few years been considering the attitude of the public towards the corporations until now we are forced to consider more than ever before the attitude of the corporations towards their own employees. Fortunately or unfortunately, the public have had and will have a good deal to say even on this subject, as has been clearly shown in a recent strike in Boston, and the attitude of the public will have an increasing influence in my judgment.

The fundamental conditions of our industry have not changed radically in the past few years except in the largely increased proportion of foreign-born operatives, and I venture to assert that conditions are not at all as serious as many of the present day magazine writers would have us believe.

We have heard much of late to the effect that the wage system is becoming obsolete and that the employees should own the tools and machinery with which they work. I personally believe that for practical purposes it is useless to consider any other system than the wage system. The program of the radical socialists may some day commend itself to thinking people, but this is too remote for practical consideration. While a small group of employees are advocating the abolition of the wage system, we are obliged to run our mills on the existing system, and it seems more profitable to consider means of improving it to the mutual benefit of employers and employees.

I do not believe that the employers as a whole are opposed to organizations which are working for the real good of the operatives and the community, but in this country of ambitious and liberty-loving men, limitation of wages or earnings or of the hours of work (in the case of adult men), the limitation of apprentices and the closed shop should not be tolerated. It is to the advantage of the industry, notwithstanding what outside critics may say of our attitude, to encourage the largest earnings on the part of all and to develop the individual as rapidly as possible. In some instances more sympathy and cordial co-operation are needed between the foremen and the operatives, but one of the essential principles in which we all believe is that the strictest discipline is as necessary in the factory as it is in the school, the home, or the army. This is not only essential to the success of the mill, but of the individual and the community. The question of discipline is, of course, one of the most serious problems of the industry where so many foreigners of diverse tongues and customs are employed, but it is nevertheless a problem which must be met and worked out successfully for the very reason that discipline is so fundamental to success. It is quite apparent in the recent troubles, not merely in the textile industry, that one result of the strikes is a lessening of discipline. We hear this on all sides. I do not mean by using the word "discipline" to suggest anything but fair, courteous treatment, but there must be the wholesome respect for law and order in the industrial organization as well as in the political organization at large.

There are two particular plans which have been suggested in recent years for encouraging the loyalty and devotion of operatives to the corporation. I refer particularly to the question of profit-sharing and pensions. I am not going to advocate either system, but merely suggest that very serious study be given to both of these in connection with the textile industry. I know that some textile manufacturers have given very careful thought to both of these plans, and to a certain extent, have put them into effect.

The difficulty in the case of profit-sharing seems to be that the class of labor employed in the textile mills as a rule is not yet of sufficient breadth of view and intelligence to be properly stimulated by a profit-sharing plan. This is at least true of the average operative. Some few years ago, the Fall River cotton manufacturers thought, I believe, they had solved the question by fixing wages on a sliding scale, based, as I understand it, on the difference between the cost of the raw material and the price of print cloths. This was satisfactory to the employees so long as it gave them the same or increased wages, but when it resulted in the reduction of wages a new system had to be devised. I am inclined to think, therefore, that the industry has not developed to a point where any ordinary plan of profit-sharing is practical, although I know some of you manufacturers will probably differ with me on this point, and I should hope to encourage a further discussion of this plan.

When it comes to the question of pensions, I think we are all inclined to feel that this is more practical. The first great objection which is raised is that of expense. Many experienced and broad-minded men do not believe that a corporation is justified in paying out the money of the stockholders for this purpose, and yet I know in the case of the railroads where the system has been introduced to a marked degree, the feeling of the executives is that it is more economical to pension their old employees rather than to keep them on the active roll when they can give only partial service at best. There is no doubt that it is to the interest of the great industrial corporations to bind to the companies by ties of loyalty as many of their operatives as possible. A pension system enables a man to work earnestly, faithfully and whole-heartedly for the interest of the company, feeling sure that he will be protected and provided for in his old age.

Another very important phase of the relationship between the mill owners and their operatives is so-called welfare work which is being carried on in many of our textile establishments. Welfare work comprises a wide range of activities, and there can

be no question but that good results have been shown where the corporation has tried in a wise way to arouse the interest of operatives in the community to their personal benefit. This work has been carried on chiefly in communities where the operatives of only one corporation live in the community, and I understand that not so much has been done by the corporations themselves in large communities like Lowell, Lawrence, Fall River and New Bedford. By this I do not mean to say that the community itself is not doing in many instances a valuable work, but there is lacking the direct interest of the corporation in welfare work for its own employees. I am quite aware that even in this matter men of experience differ. Many hold the view which is based on experience that the work is not fully appreciated and does not bring a satisfactory return in the increased interest and enthusiasm of operatives, but I am inclined to feel that this is a very important means of improving the relationship with the employees, particularly where the work is carried on to a very large extent on a self-supporting basis, so that men and women can feel that the work is their own and can enter into it with a feeling of self-respect and personal interest. Much is, of course, being done in all large communities through a wide variety of agencies, but more can and should be done on the part of the individual companies in helping the operatives in their daily life when not actually engaged at work in the mill.

Another plan of work which is being suggested and carried into effect by some of the larger corporations is the system of resident nurses, the object being to put into each mill a competent woman who will watch closely the physical condition of the women and girls in the establishment with the idea of advising with them how to live wisely and help them in times of sickness. They are also on the spot to administer aid to any one in case of accident. Dr. ARTHUR T. CABOT of Boston has had this particular work very much at heart. He became interested in it particularly through his interest in the prevention and cure of tuberculosis, and felt that with this system of resident nurses in the factories, consumption could be controlled from the begin-

ning and stamped out much more effectually. Out of this has developed the larger plan of having competent nurses to administer to all the physical needs of the women in the plants, and a great deal can be done for our work people by some such plan. It would probably not only pay the corporation from a money point of view, but will undoubtedly enable the corporation to perform a duty which perhaps many of us are overlooking.

So, with these few suggestions, I have tried to urge the importance of a careful study of these problems, believing that the necessity for careful thought is greater now than it has been for many years. Apparently the public is expecting as much of corporations as it would from individuals, and we would all agree that in our individual capacity we should feel it not only to our advantage from a commercial point of view, but also to be our duty to take a more active interest in bringing about a cordial relation between employer and employee, and we are more than ever convinced of the seriousness of the problem when we talk with well-informed people and realize that with our profit-sharing and pensions and welfare work there is something still lacking which seems to be essential.

Although I fully appreciate that politics is an extremely dangerous thing to discuss, the political situation is of such vital importance to our industry that I shall take the liberty of saying a few words in view of our important elections this fall. I sincerely hope that our distinguished Democratic guest of the evening will take no exception to my remarks, as I am not in any way advocating the principles of any party, except in so far as they directly affect the cotton manufacturing industry.

It is perhaps unfortunate that the textile industry is so dependent on a protective tariff. Whether we shall ever be in a position to be independent of it is a question which can fairly be discussed, but, for the present at least, we are facing an inevitable tariff revision which, if done wisely, can only help the stockholders and operatives alike. On the other hand, any radical reduction which would seriously disturb the present

conditions would, I sincerely believe, be most disastrous to our industry and the country at large.

It is most unfortunate that the Wool Schedule — Schedule K — has been made a foot-ball by politicians of both parties. While we here are not directly interested in this schedule, the woolen and worsted industry is akin to our own and we have looked with the greatest alarm on the widespread misrepresentation that has been the fate of this industry. Fortunately for the textile industry we have had a Tariff Board, which, particularly in the case of the wool industry, made a very careful and conscientious study of the whole subject, and their report is gradually readjusting the minds of the members of Congress as well as the public at large to a saner and fairer view of the situation. While there appears to be some difference of opinion as to the fairness of the Tariff Board in its investigation of the cotton manufacturing industry, undoubtedly the work, so far as it went, was done conscientiously and fairly. The time afforded the Board for this investigation was extremely limited, and it is perhaps fair to say that the investigation was not as complete as it might have been if more time had been allowed. Therefore, those of us who are inclined to take exception to some of their statements should seek to secure information which will extend their investigation and be prepared to present to Congress, at the proper time, a statement of all the facts relating to all branches of the industry.

Apparently there is a growing feeling in both parties that a Tariff Board of some sort can very materially aid Congress and the President in tariff matters, and I sincerely hope that, whoever is in power, justice will be done to all industries by establishing some permanent board or bureau that can in an impartial way present to Congress and the public the real facts that should influence and shape tariff changes. I hope you will all clearly understand that on this occasion I am not advocating in any way the election of any candidate for any office, but, as a representative of the cotton manufacturing industry, I sincerely appeal to all, of whatever political faith, to realize that radical changes in the

tariff must necessarily have a very serious effect on not only the earnings of the mills but on the earnings of the operatives themselves. I have had an opportunity, personally, to go into some of these matters quite thoroughly during the past three or four years, and I am firmly convinced that no such changes as are frequently advocated can possibly be made without resulting in great suffering to operatives and owners alike. I do not believe that any one seriously advocates changes that would have this result, and yet it is perfectly clear that the average member of Congress, and certainly the public at large, have not the time nor opportunity to carefully study this problem. It is therefore much to be hoped that full time and consideration will be given to those who have made a serious study of the tariff in relation to our industry before anything is done. We are not opposed to reasonable changes, and we certainly are not opposed to an impartial investigation of our industry, such as was made by the Tariff Board, and we welcome in every way a wider knowledge of the facts on the part of the country at large.

Although we have these two serious problems facing us which I have just been discussing, nevertheless we all believe in the continued prosperity of this country, and that the judgment of the American people in the long run is just. Yet we who are assembled here this evening have a peculiar responsibility at this time which we cannot overlook. If we all give serious attention to these two problems, our industry will undoubtedly continue to grow and prosper.

At the conclusion of the President's address, the members and guests joined in singing "America," and the meeting was then declared adjourned to Tuesday morning at 10 o'clock. The members and guests were informally presented to President GREENE, Governor BALDWIN and Mayor MAHAN, after which the remainder of the evening was devoted to sociability.

SECOND SESSION.

TUESDAY MORNING, SEPTEMBER 10, 1912.

The Association met at 10 A. M., President GREENE in the chair.

The PRESIDENT. The meeting will come to order. Before we take up with the programme, the Secretary will read some notices which have been submitted.

The SECRETARY. The Committee on Meeting wish to submit, in regard to the tennis competition, that Mr. HENRY G. LORD will have charge of the same and all who wish to participate must enter their names on the list posted in the office of the hotel, opposite the desk. Entries will close at eleven o'clock and matches will start as soon after twelve o'clock as possible, and the Committee has appointed the following committee on the golf tournament: G. A. AYER, *Chairman;* M. H. COFFIN, G. C. HINCKLEY, G. F. STEELE, J. R. MACCOLL, G. S. BARNUM. All who wish to participate must hand in their club handicaps to the committee, who will arrange all handicaps and receive score cards.

The PRESIDENT. The next paper on the program is International Tariff Relations, by SAMUEL GUYTON MCLENDON, B.L., of Atlanta, Georgia. Mr. MCLENDON is the author of the well-known book on the tariff with the same title, and as the author is not present I will ask the Secretary to present the paper on his behalf.

INTERNATIONAL TARIFF RELATIONS.

SAMUEL GUYTON MCLENDON, B.L.,
321 Kimball House, Atlanta, Georgia.

Congress, in 1791, requested MR. JEFFERSON to investigate and report upon the facilities and restrictions of the commerce of the United States in foreign countries. MR. JEFFERSON spent two years investigating the subject, and submitted his report in 1793. In this report MR. JEFFERSON mentioned only seven articles of American commerce. These were tobacco, breadstuffs, rice, fish, whale oil, salted provisions and vessels. The countries brought under review were five, viz: England, France, Spain, Sweden and Portugal. Lying before me as I write are, translated into English, three hundred and forty customs tariffs, representing the tariff laws of every country in the world, as the same stood January 1, 1912. MR. JEFFERSON found and reported in the five countries named many restrictions and prohibitions. Deploring the existence of these restrictions, and expressing the belief that all countries should trade with each other on a free trade basis, MR. JEFFERSON said:

"But should any nation, contrary to our wishes, suppose it may better find its advantage by continuing its system of prohibition, duties and regulations, it behooves us to protect our citizens, their commerce and navigation, by counter prohibitions, duties and regulations also. Free commerce and navigation are not to be given in exchange for restrictions and vexations; nor are they likely to produce relaxation of them."

An examination of the three hundred and forty tariff laws now before me brings clearly into view the fact that they group themselves into two distinct classes.

In one group of countries, we find tariffs levied solely for

the purpose of revenue. This group include the United Kingdom, China, India, Egypt and Siam. The other group, or protective group, embraces Germany, France, Russia, Italy, Sweden, Norway, Denmark, Switzerland, Japan, Spain, Mexico, Venezuela, Argentina, Brazil, and all of the self governing British colonies. The two countries which, at the present time, are most completely representative of the two groups are the United Kingdom, representing the tariff-for-revenue-only group, and France, representing that group of countries which levies its customs duties both for revenue and for protection. I mean, of course, countries which levy tariffs openly, avowedly and intelligently for protective purposes. Great Britain followed a protective policy from 1643, the date of the first navigation act, down to 1846, when it adopted the revenue policy of RICHARD COBDEN. The United States has always followed, with occasional movements backward, the protective ideas of THOMAS JEFFERSON. Germany has always followed the advice of BISMARCK, who declared in 1871:—

"I base my opinion on the practical experience of the times we live in. I see that the protected countries are prospering and the free trade countries decaying."

The present purpose is, in the discussion of international tariff relations, to deal more particularly with the United Kingdom and with France. But a few words may be said about Germany. This country is not only one which applies the protective principle in its trade regulations, but as the owner of all its railroads, the freight charges on government-owned roads are made for the purpose of supplementing the tariff regulations as a means of extending German commerce. On all competitive export traffic, the German government makes, over publicly owned railroads, freight charges very much lower than are made on its domestic traffic. For example, on machines and iron wares, from Frankfort to Hamburg, the domestic rate is $3.83 per ton, while the export rate is $1.33 per ton. On iron products, such as beams, etc., the domestic rate from Frankfort to Hamburg is $4.71, while the export rate is $1.67. It is a fact that Germany does not make a lower rate on import traffic over its railroads than it makes on its domestic traffic. The German

view is that to make low rates on import traffic would destroy pro tanto the benefits of the protective tariff, while to make low rates on export traffic strengthens the hands of the German manufacturer in the competitive international market.

In its freight classification, Germany finds another means of trade regulation and discrimination as illustrated in the case of American pine, which is classed with mahogany and teak-wood, while pine from Norway and Sweden is put in a lower class and given a lower rate.

But to go back to the United Kingdom. In 1846, when COBDEN'S views were adopted by Parliament, he declared that he expected three results to follow: The first would be the establishment of free trade within five years throughout the world. This expectation not only did not come to pass, but the world moved in the opposite direction, and Canada swung to the opposite extreme of COBDEN'S view, by incorporating in its tariff of 1907, as section 6, the following language:

"In the case of articles exported to Canada of a class or kind made or produced in Canada, if the export or actual selling price to an importer in Canada is less than the fair market value of the same article when sold for home consumption in the usual and ordinary course in the country whence exported to Canada at the time of its exportation to Canada, there shall, in addition to the duties otherwise established, be levied, collected and paid on such article on its importation into Canada, a special duty or dumping duty, equal to the difference between the said selling price of the article for export and the said fair market value thereof for home consumption, and such special duty or dumping duty shall be levied, collected and paid on such article although it is not otherwise dutiable."

This dumping duty imposed by Canada puts that country in the forefront as an advocate and supporter of the protective principle.

MR. COBDEN'S second expectation was that the United States, as a result of the COBDEN Tariff, and of the WALKER Tariff, companion pieces of legislation, would be reduced to producing only raw material, and he predicted that the United States would "dig and delve and plow for Great Britain." This expectation

on the part of MR. COBDEN has not been realized, and to impeach his prophecy, the United States can point to the record of 1910. In the year 1910, the United States had 268,000 manufacturing establishments. These establishments consumed $12,141,291,000 worth of raw material, turned out $20,672,052,000 worth of manufactured products, gave employment to 7,405,313 persons and paid out in salaries and wages $4,365,613,000. The United States collected as import duty on over 2,000 dutiable items, $330,000,000. For the same year, Great Britain collected at its ports on twenty non-protected dutiable items $146,395,755. Great Britain for the year 1910 paid out to 1,065,645 paupers under seventy years of age, and to 907,461 paupers over seventy years of age the sum of $133,415,995. The United States for 1910, under protection, paid out nothing for paupers, while so called free trade Great Britain paid out to keep five per cent. of its population from starving nearly as much as the United States paid as pensions to its soldiers. The question would naturally arise, whose is the better policy, that of JEFFERSON or that of COBDEN? Which of the two countries makes the better record? MR. COBDEN'S prophecy that the United States would "dig and delve and plow for Great Britain" has not been realized.

In 1902 JOSEPH CHAMBERLAIN cried out to the countrymen of RICHARD COBDEN: "I have not threatened the immediate disruption of the Empire, but I do not believe we can permanently keep the Empire together except upon lines which have been understood and adopted and worked upon by other countries with success. What is the remedy? Let us get rid of the chains which we ourselves have forged and which have fettered our action. Let us claim some protection like every other civilized nation."

The United Kingdom has not yet adopted the protective policy, but since 1902 all British colonies have, and they are defending themselves and supporting British commerce by their preferential tariffs. In 1911 the tariff for revenue only, or free trade party, and the protectionist party each elected two hundred and seventy-two members of parliament.

MR. COBDEN'S third prophecy and expectation was that by the

establishment of free trade the British government would be able to dispense with its navy, which he deemed a mere police protection to its commerce on the high seas. At the time MR. COBDEN made this prophecy in 1846, the cost of the British Navy was £6,809,872; in 1911 the cost of the British Navy was £46,204,799. It must be borne in mind that the British people have to pay practically the entire cost of maintaining their army and their navy. To the support of the navy, whose protection it enjoys, Canada contributes nothing. To the support of the British Navy, India contributes only £103,400., Australia and New Zealand together £307,500., Cape Colony £46,000., Natal £35,000., Newfoundland £3,000., making a total of £494,900. Treating the cost of the British Navy as an item of insurance or protection, it costs the home government $2.13 on every $100. worth of commerce that floats under the British Flag.

Going back to MR. JEFFERSON'S report of 1793, and taking his reference to the restrictions imposed by France, it is well enough to look at the present tariff laws of France and see to what extent American commerce is restricted or prohibited in that country. In 1907 France undertook a revision of its tariff laws. This revision was not to be made upward or downward, as a predetermined purpose, but it was a revision which was to be made in the interest of the commerce of that republic. After three years of arduous and scientific investigation, the French adopted the present law in 1910. Here are some of the items and rates of duty specified in the existing tariff:

No. 17.	Bacon, beef and salted meats	4.38 cents per pound.
No. 30.	Lard	3.5 cents per pound.
No. 72.	Corn	15 cents per bushel.
No. 88.	Wheat	37 cents per bushel.
No. 91.	Sugar	2.72 cents per pound.
No. 111.	Cotton Seed Oil	3.00 cents per pound.
No. 419.	Cotton Gloves	$1.14 per pound.
No. 442.	Woolen Carpets	$1.61 per square yard.
No. 443.	Woolen Gloves	$.79 per pound.
No. 451.	Woolen Blankets	$.76 per pound.

These figures would certainly appall MR. JEFFERSON if he were alive. The idea that a pound of American wool, worked

up by an American wool manufacturer into gloves, would have to pay an import duty of 79 cents for the privilege of being offered on the French market, passes far beyond the limit of protection and becomes prohibitory. The fact that a pound of American wool, worked up by American capital and American labor into a woolen blanket, would have to pay an import duty of 76 cents, if communicated to the American wool grower, would not be calculated to stimulate his desire to see the American market for blankets thrown open without restriction to the French manufacturers. When the American wheat grower is told that while the United States only charges France an import duty of 25 cents per bushel for selling French wheat on the American market, France in return charges 37 cents per bushel for the privilege of selling a bushel of American wheat in France, he is not likely to become enthusiastic in a demand for a reduction of duty on any article manufactured in America, the manufacturer of which buys American wheat, in order that the French manufacturer could put the American manufacturer out of business, and thereby render him unable to buy American grown wheat.

The list of articles in the French tariff, whose duties are so high as to prohibit the sale of those American articles in the market of France could be greatly increased, but it would be unnecessary. France under protection, by reason of protection, or in spite of protection, has become the greatest money lending nation in the world. The advanced statesmanship of every growing country, giving profound and accurate study to the problems of commerce, and to international tariff adjustments, has everywhere and with increasing force abandoned the tariff-for-revenue-only doctrine, and has established the protective principle. Thirty years ago Sweden bought all of its sugar; today it produces all of its sugar. That country, having lands suitable for the growth of the sugar beet, thirty years ago imposed a protective tariff on sugar, and its duty on sugar today is 1.82 cents per pound. The effect of that policy has been to turn a large amount of Swedish labor and large sums of Swedish capital into the cultivation of the sugar beet and into the manufacture of beet sugar. The Swedish farmer is protected from a destruc-

tion of his industry by the foreigner, through this tariff of 1.82 cents per pound. The sugar industry of Sweden is the absolute product and creation of a protective policy, and yet the price of sugar in Sweden is controlled, not by the tariff, but is controlled on the international sugar market. Brazil a few years ago produced no rice. That country had vast areas suitable to the culture of rice, and was the buyer and consumer of 2,000,000 bags of foreign rice per annum. To encourage and protect the culture of rice, Brazil imposed an import duty of 3 cents per pound on foreign rice. The result is that today Brazil imports practically no rice whatever, but Brazilian capital and Brazilian labor produce all the rice needed in that republic. Brazil now keeps this money at home.

Japan, only 15 per cent. of whose soil is arable, imposes a protective tariff on rice, and yet it might buy rice at a lower price than it could produce it from British India, Siam and China. The Japanese duty on rice was advanced 50 per cent. in 1911 for protective and not for revenue purposes. Cheaper rice might destroy his business and then the Japanese rice grower would be unable to buy even cheap rice; hence, his government protects him with a tariff.

The Republic of Brazil charges an import duty of 7.25 cents per pound on raw cotton, which is purely a protective duty, and this is done to encourage cotton culture in Brazil. That republic imposes correspondingly high import duties on manufactures of cotton, and this is done to encourage the manufacture of cotton in Brazil, and to create a home buyer for a home product.

The writer has for several years made a study of the changing lights and shadows on this great economic problem of international commerce, as affected by international tariff relations. Every progressive country in the world is almost daily making its tariff regulations more and more protective, and more and more scientifically protective, keeping in view the subject of revenue to be derived from those articles which it cannot produce, and applying protection both to the raw commodities and to the manufactured article, according as the country had the one or both to protect. The dead and non-progressive countries of the world, on the other hand, adhere to the principle of a

tariff for revenue only. In China the maximum tariff is 5 per cent. In Egypt it is 8 per cent. In British India it is 5 per cent., and in Siam 3 per cent. ad valorem.

Turn to the other countries of the world, and their tariffs are constantly increasing in the number of articles made dutiable, and constantly increasing the application of accurate and scientific knowledge in working out tariff schedules. It is often said, and almost universally believed, that the tariff is the father of the trust. This is not true. The trust is the direct offspring of unrestricted competition. Coffee, which pays no duty in the United States, the largest consumer of coffee, is said to be controlled by a trust, and yet the United States has admitted coffee free of duty for forty years. Government cannot control prices, but it can restrain and regulate that competition whose sole object is the destruction of competition. The pitiable helplessness of small capital is the meat on which this Caesar has fed. When a trust grows strong enough to dictate the price at which it will buy and the price at which it will sell, assailing it with so-called tariff revision downward is simply pelting the trust with paper wads. In all the trials which have been held in the United States, where persons or corporations have been prosecuted for a violation of the anti-trust laws, the question of the power of the trust as based upon the tariff has never once been touched. It is the power of combination on the one hand and the defencelessness and unprotected position of the individual on the other, and not the tariff, which are destroying the small and adding power to the strong. The evils are great. The consumers are mad. Their advisers are many. We are told that in the multitude of counsel there is wisdom, but we are also told that there are those who darken counsel by words without knowledge. Congress furnishes the proof of the latter proposition. The remedy is to protect both agriculturalist and manufacturer against the foreigner by intelligently and wisely constructed protective tariffs, and to disarm the trust by legislation that will re-establish fair trade. The fair trader needs protection on two sides. On one side he needs protection from the foreigner. On the other side he needs protection from the little trust and from the big trust. The big trust is only the

survivor, following in the wake of a large number of preceding smaller trusts. Under laws that would provide for fair trade, neither the big trust nor the little trust could thrive by extermination and subsequent extortion. Such laws could be enacted as would insure fair trade, and only by such laws can the power of the trust be destroyed. So far as the tariff is concerned, this ought to be regulated only after a thorough, comprehensive and scientific investigation, and after the law-making power of the country shall have been placed in possession of full information as to our international tariff relations. The trust question should be considered separate and apart from the tariff question, because when the trust becomes strong enough to make prices, it becomes strong enough in making prices to ignore tariffs, and to make prices, tariff or no tariff. This is illustrated in the case of coffee. Internal commercial peace will be established and socialism checked when Congress creates for each state a Court of Fair Trade. That court ought to be established in every state and should proceed substantially in the following way: Whenever any person, firm, company or corporation engaged in interstate commerce, or in buying and selling any article or commodity which is dealt in in interstate commerce, shall believe that his or its business is restricted or damaged by unfair competition, said person, firm, company or corporation should have the right to invoke the aid of the Court of Fair Trade. Such person, firm or corporation should file with this Court a petition in writing, duly sworn to, setting out all the facts necessary to make out a prima facie case of unfair trade. This petition should be served upon the party complained against, and the Court should fix a day for a hearing and a place convenient and accessible. At the hearing, both sides should be fully heard in person, or by counsel, or by agent. Said Court should be required to ascertain the following facts:

First: Does the invading competitor enjoy the benefits of any law, or the benefits of membership in any association or combination not enjoyed by complainant?

Second: Would complainant's business be unfairly restricted or damaged by a continuance of the competition complained of?

Third: Would the business of complainant be destroyed by continuance of such competition?

Fourth: Would a monopoly, either local or general, be created, promoted or extended by a continuance of the business of the invading competitor.

The law should provide for the fullest and freest hearing, and should the Court find conditions of unfair trade to exist, or should find that monopoly would result, with the consequent power to advance prices arbitrarily, the court should frame such judgment in the premises as would guarantee free trade uninterfered with by competition which would result in monopoly and higher prices.

International tariff relations and their adjustment are commanding the attention of the highest legal, banking and commercial talent of the world. This great economic problem of international commerce is everywhere studied and acted upon with more deliberation and more accurate knowledge than in the United States. Business with us is made a pig skin bag on a political office-seeking gridiron. It is sometimes said that the tariff question ought to be settled and then let alone. It would be just as easy to enforce a law providing that there should be no more storms on land or sea, or to enforce a law prohibiting any further religious controversy. Commerce is war, the world over. Its purpose is the acquisition of trade and riches, and until the world can come to a common agreement, there will always be commercial warfare. The world has never known but one man whose philosophy was a sure remedy for every discord, and He was born at Bethlehem. So long as success, material success, financial success, is the goal of human ambition, just so long will mankind, singly and en masse, be engaged in struggle.

The tariff question will be an open one until the end of time. The wise regulation of the tariff depends upon methods which have not yet been adopted in this country. When such methods are adopted, they will involve a separation of the tariff question from the trust question, and a treatment of each upon the highest lines of unimpassioned, resolute and patriotic purpose.

HOMER wrote, "It goes ill with common men when Kings are angry." The sons of ISSACHAR, "men that have understanding of the times to know what Israel ought to do" cannot now

be heard for the noise. Empiric and myopic statesmanship brewing legislative nostrums, narcotics, irritants, and counter-irritants, in the witches' cauldron, is hastening the day of socialism, when it will be a crime to own a dollar; or else that statesmanship, through stress, and storm, and blindness in laying deeper foundations in the affections of the people for the Constitution, and the policies of the fathers of the Republic.

The writer is an optimist.

The PRESIDENT. We will now pass to the second paper on the program, which is Dust-proof and Waterproof Mill Flooring, by Mr. S. W. FLESHEIM, Secretary of the Master Builders Company, Cleveland, Ohio. Before I introduce Mr. FLESHEIM I would like to say that he intends to speak but a very few minutes, but would like particularly to have those who are interested in this subject, as most of us must be, to ask him questions and start a discussion in regard to it. I take pleasure in introducing at this time Mr. FLESHEIM.

Mr. S. W. FLEISHEIM. Mr. President, in presenting this subject of waterproof and dust-proof mill flooring it has been necessary to mention the name of the Master Builders Company in several instances. This has not been done with any view of advertising either the company or its products, but the company has been so connected with the installation of successful concrete flooring in mills and factories that it would have been impossible for me to present the subject without making mention of this fact several times, so I trust you will pardon this in the course of my talk. Unfortunately, the express company in sending a number of samples of mill flooring to this point lost them and they have not arrived, and therefore it will be impossible for me to pass them around as I had intended. However, I have brought a book of photographs which I would appreciate

very much if the Secretary would hand to the members, so that they can see pictures of work that has been done as I present this sketch. After I have finished I will be very glad to answer any questions that you gentlemen may have to put up to me and I will do my very best to answer them intelligently and quickly.

WATERPROOF AND DUST-PROOF MILL FLOORING.

S. W. FLESHEIM, Secretary, The Master Builders' Company, Cleveland, Ohio.

One of the most vital problems in modern warehouse and factory construction is to obtain a satisfactory floor. Probably no part of the plant has to withstand more severe service, more heavy wear and abuse, than the floor. Let me illustrate this point:

Take for comparison the roof of the factory building. This roof is contracted for and put in place. After its completion it is not called upon to withstand any service except the tax of weather conditions, — and yet roofs are expensive, and owners pay the price rather than have leaky roofs and unsatisfactory ones.

On the other hand, take the warehouse or factory floor. When the floor comes up for consideration, the average owner does not realize the immense importance of getting a floor that will not only be in good condition when put in place, but that will withstand heavy trucking and hard service in every respect for years to come. It is the intention of this paper to take up this floor problem and point out the importance of obtaining the best warehouse and factory floors with a view of enabling the owner to get the greatest amount of value and the greatest efficiency for every dollar invested.

Briefly, there are four classes of floors that are practical for warehouse and factory use. First, wood floors; second, brick floors; third, composition floors; fourth, concrete floors.

WOOD FLOORS.

There are requirements in some classes of plants and factories which nothing short of a wood floor will fulfil, and for which no conscientious advisor would recommend anything else, but for universal service wood is gradually passing out of use:

First, because wood is becoming more expensive every year.

Second, the great demand for absolutely fireproof buildings is excluding wood from consideration because its presence in a building increases the insurance cost, which is a vital point to be considered.

Third, one of the worst features of the wood floor is that it is unsanitary. It readily absorbs all moisture, and the cracks between the boards become the breeding place for vermin. The wood floor is hard to keep clean, and this involves a much larger item of expense than the other classes that will be here mentioned.

COMPOSITION FLOORS.

(This class comprises asphalt, mastic and the various other compositions of magnesia, marble, etc.)

This class of flooring has its particular use for which it is especially well designed, but for factory purposes, it is hard to install, cracks easily, and does not withstand heavy wear. Furthermore, this type of floor is exceedingly expensive, costing all the way from 18 to 30 cents a square foot, which, of course, would eliminate it from consideration on factory work of any size.

BRICK FLOORS.

It is hardly necessary to consider the brick floor in this paper.

First, it is hard to work on because it is not perfectly smooth; furthermore its great weight increases the expense of the building excessively, because it necessitates heavier columns, beams and supports.

Brick floors are expensive, and for that reason are practical only in such places as foundries and rolling mills where usage is so heavy and severe that nothing but this class of surface will do.

Where extremely heavy castings, steel bars, etc., are continually falling and striking their sharp edges into the floor, either the vitrified brick or steel plates can be successfully used.

CONCRETE FLOORS.

The ever-increasing reinforced concrete building helps to solve this floor problem by making the concrete floor possible.

The advantages of a concrete floor are:

First, concrete floors are easy to lay. The material necessary to their construction is almost always very close at hand; good sharp sand, perfectly fresh cement are easily obtained. Furthermore, a successful floor is an easy matter if the proper method of laying is thoroughly understood.

Second, concrete floors are absolutely fireproof. As they have passed all insurance regulations, reduced fire insurance costs result. The great demand for absolutely fireproof buildings means that the concrete floor is the final step in this direction.

Third, concrete floors are inexpensive to install compared to any other class of flooring. Materials for their manufacture are cheap; small amount of labor is required, and maximum results are obtainable. For every dollar spent in proper installation full value is received.

Fourth, the concrete floor is sanitary. Having no seams, cracks or joints such as are in the wood floor, and in which vermin, dirt and sweepings usually gather, the concrete floor is perfectly sanitary. When dirt and dust accumulate upon its surface, this can be all cleaned out by turning a hose on the floor. This cleans it well and thoroughly and prevents the accumulation of dirt and its accompanying disadvantages.

Fifth, the concrete floor is vermin proof. A concrete building being a homogeneous mass, there is no place for vermin to

hide. Mice, rats, cockroaches, and other pests are excluded automatically from a concrete building. Occasionally, of course, these vermin come in with raw or unfinished goods. If this is the case, they are easily eradicated. This property of concrete buildings is often worth considerable money to the owner, as in both warehouses and factories, where the goods contained are subject to inroads of vermin, the losses are frequently very high.

Sixth, the concrete floor is permanent. When concrete is once thoroughly set and cured it is an almost unchangeable mass. There is no deterioration due to age, rot or decay. Concrete floors never sag, in fact, their great rigidity means that buildings can today be built with practically no apparent vibration. This is a very distinct advantage particularly for industries employing machines with great leverage, strains and stresses.

Seventh, the concrete floor if properly laid will wear almost indefinitely, will be absolutely waterproof and dust-proof.

But to make it wear almost indefinitely and to build it dust-proof and waterproof, it must be more fully understood. Concrete is inherently porous. The very materials that go into its making cause this porosity. A magnifying glass will reveal millions of these pores in a very small stretch of surface. This porosity has a three-fold disadvantage.

First, it leaves the concrete in such condition that water can easily seep through.

Second, continued wear or heavy service causes granulation. This means that the floor becomes very dusty and soon wears into ruts and holes of ever-increasing size.

Third, these holes in the past have been an extremely difficult problem to overcome, because it has been found almost impossible to patch them successfully. Therefore, even though the concrete floor has almost every point in its favor, the fact that in the past it has been extremely difficult to lay concrete floors that would be wear-proof, dust-proof and waterproof, has condemned and decreased their popularity.

Having investigated these defects thoroughly and conscientiously, we are now prepared to offer the solution of the problem

and to prove by hundreds of actual cases that concrete floors laid according to the specifications of the Master Builders' method, protected by United States patents, will be wear-proof, dust-proof and waterproof.

To accomplish these results the following are essential:

First, first class material such as good, sharp, clean sand; perfectly fresh standard Portland cement.

Second, good workmanship, meaning the services of men who understand the finishing of cement.

Third, by filling the pores of the concrete body with some substance which has a greater abrasive, tensile and compressive strength than any of the materials that go into the making of the ordinary concrete floor.

Fourth, expert supervision. By this I mean the services of some one who understands thoroughly the handling and finishing of floors, in order that the workmen can have proper supervision; also that the floors are properly taken care of after they are finished. This means a great deal to the owner and is one of the most important points connected with the laying of concrete floors.

In laying Master Builders' method floors a very finely divided mineral powder is added to the topping in the mixing. This powder when acted upon by moisture fills the pores completely, making an extremely dense body, through which water cannot ever penetrate, and which will withstand extreme and continued wear.

Another reason why the ordinary concrete floor has been a failure to such a great extent is because the general contractor has not thoroughly understood the science of concrete floor construction, and the handling of cement, the contractor's object being the laying of the greatest quantity of flooring rather than the best quality.

Remember that a concrete floor, unlike a wood floor, is manufactured on the spot, and must therefore have the same care, the same conscientious handling necessary to any other manufactured product. Therefore, a superintendent familiar with

the mixing, handling, laying and finishing of cement should be on the job, and in complete charge of the work from the time it starts until it is finished.

Floors made by the Master Builders' method, which includes its supervision, will give maximum wear. Such floors are absolutely waterproof, because they are manufactured from the proper materials, under the proper supervision. This, of course, entails an additional cost in the installation of the floor, but when the disadvantages of the ordinary concrete floor are considered and the chances for failure are weighed, the owner cannot afford to do without this service. One shut-down necessitated by bad floor construction will cost many times the additional expense necessary to obtain a perfect concrete floor.

Concrete floors are sometimes painted to prevent the rise of dust. This is but a temporary remedy and, at best, unsatisfactory. There is in reality no need for painting concrete floors, for they can be built dust-proof.

We have complete specifications covering concrete floors, with further facts and proof in figures which I shall be very pleased to furnish for your information. I shall also be glad to refer you to factory owners who have taken advantage of this service and specification in the erection of their factories.

If you have concrete floors at the present time which are giving unsatisfactory service due to holes and badly worn places, valuable information and facts to remedy this annoyance quickly and economically will be sent upon request.

HOW TO MAKE YOUR CONCRETE FLOORS LAST AND GIVE THE UTMOST SERVICE; THE USE OF PROPER TRUCKS.

Bad truck wheels are ofttimes the cause of serious trouble with floors. These wheels are too often sharp-edged and in turning gradually grind into the surface. It is just as easy and no more expensive to have trucks with slightly convex wheels. These will never cut the surface, and will make the trucks longer lived, as well as the floor. It is ofttimes practical and just as inexpensive to use rubber tired wheels. Where this is possible it is most highly recommended.

EXPANSION JOINTS.

One detail which was heretofore responsible for unsatisfactory concrete floors, to a certain extent, was the practice of marking off concrete floors in four foot squares for expansion joints. This was done with the aim of doing away with any possible cracking of the finish. Truck wheels bumping against the corners of these joints soon start the floor to crumbling and disintegration soon occurs. A great deal of this trouble can be avoided by using reinforcing wire or by expansion joints only in the center line of the columns, which should be not less than twenty feet apart.

There are some engineers who do not recommend any expansion joints in concrete floors claiming that while these floors will crack, these cracks will be slight, and will not wear as badly at the cracks or expansion joints.

LAYING THE TOPPING ON A SET BASE.

Another reason why a great many concrete floors have not given satisfaction is because in some classes of buildings the topping is laid at the same time as the base. The various tradesmen, such as plumbers, carpenters, etc., being in a great hurry to get their work in a building, get on the floor while it is still green,—the floor not being cured, is abused, and is practically spoiled before the owner ever occupies the building. It has been necessary in the past to lay the topping and the base at the same time, because a perfect bond could not always be obtained if the topping were laid later. Floors laid by the Master Builders' method create a permanent and perfect bond between the old and new surfaces and can be laid a day or a year after the base has been installed.

Therefore by this method the building can be practically finished, and just before the owner takes possession of it, the topping can be installed which means that it will be in perfect condition when ready for use.

ANSWERS TO OBJECTIONS AGAINST THE USE OF CONCRETE FLOORS.

Effect of concrete floors on operatives. In considering this side of the matter some allowance must be made for the fact that the average workman is prejudiced against anything to which he is not accustomed, and that he is therefore predisposed to complain of a concrete floor.

Under certain conditions, however, it is clear that the concrete floor has an unfavorable effect on the comfort of operatives who have to stand inactive for long periods, as for instance in tending a machine.

The real cause of workmen's complaints is undoubtedly the coldness, and not the hardness of concrete floors. Every small boy knows that the coolest seat on a hot day is a smooth door-step. Like the stone door-step, a concrete floor feels colder than a wood floor. The low heat conductivity of wood as compared with concrete is plainly the real cause of the preference of many operatives for the wood floor.

When a concrete floor is in outward contact with the ground or with the outside air in the winter time, it actively withdraws heat from its inner surface, because it is a good heat conductor. At all seasons the concrete floor "feels colder" than the wood floor, partly because of its greater heat conductivity, and partly because its high specific heat makes it the last thing in a factory to become warmed. The effect of this rapid heat conduction on the operative who stands for hours in one place is gradually to chill his legs, and thus retard the circulation in them.

One of the remedies for the bad effect of concrete floors is the use of small movable gratings of wood or other material having low heat conductivity for the workmen to stand on when their work requires long standing in one place. Such gratings would be inexpensive, could be moved about to permit thorough cleaning of the floor, and are not very objectionable.

If one will stop to consider that he walks probably every day a considerable distance on concrete pavements without discomfort to himself and that his employees do the same thing, he

will realize that the bugbear of concrete floors is greatly magnified.

CONCLUSION.

In conclusion this paper does not advocate the concrete floor for all conditions and requirements, but after its advantages and disadvantages have been carefully considered it lends itself to more general use, because it wears longer, and is cheaper, provided it is properly installed.

The success or failure of concrete floors hinges upon very simple principles. Disregard these, and you have a failure; follow them carefully, and perfect satisfaction will ensue.

We are pleased to give the owner and the engineer or architect such further service as we can, to help popularize and bring into more universal use the concrete floor.

Mr. WILLIAM W. CROSBY. I should like to inquire if this flooring that has been described to us must of necessity be put on a reinforced concrete base, or if it is possible to put it on plank in place of top flooring?

Mr. S. W. FLESHEIM. The disadvantage of putting a concrete floor over plank would be merely this. The average tight floor, taking a mill-construction building, has a good deal of give to it. It sags in places, and for that reason concrete floors would not be successful, for the simple reason that they would crack. Take the mill type of construction, for instance, and try to lay concrete over wood, and you put the immense weight of the machinery over that, and the first thing you know it sags in the center. You cannot prevent the concrete from sagging if the floor sags. We have put a number of concrete floors over wood floors, but that has been possible by only putting in three inches of rough concrete, possibly a six to one mixture, and then putting an inch top on top of that even then you are not sure your floor will *not* crack. Where the wood floor will hold the weight of the concrete, this can be successfully done.

Mr. WILLIAM W. CROSBY. May I ask if this compound, if that is what you call it, has to be mixed with the mass of the concrete or can be applied to the surface after the concrete has already been laid?

Mr. S. W. FLESHEIM. This compound is added only to the one inch or ¾ inch that is used as the wearing surface on a concrete floor. There are floors in mill buildings which have been down a number of years which have worn badly and which show holes and unevenness, and that makes the plant lose efficiency. Now, a new topping of ¾ inch or one inch can be successfully put on over the old floor and a perfect bond obtained by the use of this material. That is done in this way: First, the floor is thorougly cleaned, and if there is any oil or grease on it, the oil or grease must be taken off. A slush coat of one part Master Builders' concrete filler and one part cement, of the consistency of paint, is then applied, after the floor has been well soaked. While this slush is wet a 1-inch topping or ¾-inch topping is applied with successful results. We have service men who travel all over the country and make it a business of visiting plants and putting in this work. Of course that is guaranteeing perfect results to the owner. It is more a matter of supervision rather than any wonderful material. Of course without the material the results could not be accomplished, but it is more the use of material than the material itself.

Mr. CHURCHILL HUNGERFORD. I should like to ask if that highly polished surface does not make a very slippery floor?

Mr. S. W. FLEISHEIM. That question has come up a number of times and the only answer I can give is that we have never found that objection in practice. Of course, as I understand it, in the average mill there is not a great deal of water running over the floor continually; that is to say, the operatives do not have to work where there is water continually running over the floor. If you took these floors and subjected them to wear

where water was continually running over them, I would say in that case there would be a chance for their becoming slippery; but as long as they are dry we never have that difficulty.

Mr. THOMAS HENRY SMITH. What effect has oil on the concrete? Does it disintegrate it?

Mr. S. W. FLESHEIM. Almost every kind of oil contains a greater or less percentage of some acid, mostly sulphuric acid in the heavier oils, and that will disintegrate concrete. In every case where I have seen a concrete floor on which oil has stood the oil has disintegrated it. The reason for that is that the oil penetrates into the concrete. If you can make the concrete so that the oil cannot penetrate and you can cover up the pores so that the oil cannot get into it, you will prevent that. This system of laying floors makes them what is called oil-proof. Of course that is used in the commercial sense.

Mr. FREDERICK B. MACY. I should like to ask if it is rock asphalt that you are talking about for finishing floors?

Mr. S. W. FLESHEIM. No, it is not. This that I am speaking about consists of the ordinary sand, the ordinary cement, and that is combined with a mineral powder. It is a very fine powder that expands when it is acted on by moisture.

Mr. FREDERICK B. MACY. A question has been asked about laying this floor over wood. Cannot that be done by using expanded metal?

Mr. S. W. FLESHEIM. Yes. That is one way of doing it. We have laid floors a great deal by using expanded metal lath, either that or any kind of reinforcing of that kind. But we do not advocate laying concrete floors over wood to any extent, just as I say, unless the wood floor is well supported. If you have good support you can do it with perfect success. I have a book of photographs here which will give some idea of the

extent of the work that has been done in that connection. I will be very glad to answer anything more that is within my power. Have any of you gentlemen had any trouble with patching your concrete floors, those of you who have concrete floors? Of course I understand that in the mill industry the floors have been mostly wood. Personally I am not very familiar with the plants of the cotton mill industry, but I understand that most of the mills have had wood floors, and of course that would prevent any chance of the floors needing patching.

The PRESIDENT. The next topic on the program is The Lithographic Process of Cotton Printing, by Mr. J. A. JEFFERSON HAYES, of Letchworth, Herts, England. Mr. HAYES, I happen to know, has been spending the month of August in Switzerland, and he has been in poor health, so that he has a double reason for not being here this morning, and Mr. WOODBURY will read his paper. I want to say, in a word, while possibly calico printing may not be of interest to you all, if this process has anything to it, it is certainly very revolutionary in its effect, as the process of printing is quite different from the ordinary and present process of calico printing. Mr. HAYES is an inventor who has been working on this process for some years and has interested quite a large amount of capital in promoting the selling of the patent rights throughout the various countries in which patents have been taken.

THE LITHOGRAPHIC PROCESS OF CALICO PRINTING.

J. A. JEFFERSON HAYES, Letchworth, Hertsfordshire, England.

For generations calico printing has been carried on in this and in other countries by what is known as block printing or hand stamping, and, of late years, principally by the mechanical use of copper rollers. The former is very expensive and consequently limited in scope. The latter is the prime factor in the trade as the commercial proposition. In both instances, aniline, alizarine and allied water colors are employed.

There have been no changes in the mechanical process worthy of the name for generations, and it has become an axiom that it is only possible to print calico continuously from engraved copper rollers, using aniline and allied colors. This axiom has always been encouraged by the results of numerous attempts to print calico by other processes — attempts which have invariably failed as commercial propositions.

It has, however, been possible, for many years, for lithographers to print small bits of calico, bit by bit, and each color separately, on lithographic machines, using colors based on oil; but the cost of production and the inability to print from the piece continuously prevented any development of the idea, beyond the use of this process for small fancy objects, such as small handkerchiefs, covers for chocolate boxes, and the like.

It was also found that these colors were far more permanent under exposure to light than aniline and other colors, but were inclined to be hard and cakey on the material.

It was realized by many that a possible means of obtaining faster colors lay here, and many attempts were made to

produce a machine which would print calico continuously by rollers from the piece, in all colors at once, by the lithographic process; but it has always been found impossible to do so.

About ten years ago, a company was formed at Radcliffe, Lancashire, to exploit a French patent to print calico lithographically from the piece, by metal plates, each color being produced separately. While that company again demonstrated the adaptability of lithographic printing upon calico, and the greater fastness to light of the colors based on oil, it was found impossible to compete, owing to the excessive cost of this particular process and the insignificant production obtainable by the mechanical methods used.

The writer was, however, still convinced that it must be possible to produce a calico printing machine which would print continuously and in all colors at once on materials coming from the reel, by lithography, from rollers; and he started three or four years ago to work out this problem.

During this period he devoted his attention, not only to the machinery necessary, which resulted in the various patented machines employed in his process, but also made a close study of the chemical side; as a result of which a very wide and varied range of color formulæ have been obtained, which give highly satisfactory results in printing.

About £50,000 has been spent by himself, his partner and their associates in developing the idea, and today the Hayes (Universal) Printing Machinery, Ltd., have, at Letchworth, a completely established industry for producing printed calicos by lithography, which has made a revolution in calico printing. This has necessitated the invention of many machines and appliances, in addition to the actual printing machine, and all these machines are patented, the main patents having been granted between 1907 and 1912 in twenty countries, including Great Britain, Germany, and the United States of America.

The new printing machines usually print in all colors at once from metal rollers, at a speed of sixty yards a minute, and can exceed this speed; and the construction of these machines

allows a change of colors and designs in a four color machine to be made in a fraction of the time required in ordinary calico printing. It will, therefore, be easily understood that these new printing machines have a considerably greater production than is possible in ordinary calico printing. These new printing machines require far less power than ordinary calico printing machines, and there is not any drying arrangement on or behind the machines, as the colors do not require heat to prevent their marking off or smearing.

In most cases, after printing by the lithographic process, the calico is merely hung and then finished. In rare instances, the printed cloth is passed through a simple bath before finishing, so that all the after processes necessary to fix or to develop aniline and allied colors disappear, and the plant required for steaming and aniline ageing is dispensed with, thereby saving the cost of both steam and labor attending thereto.

As a consequence of these great savings, the coal bill is reduced to a fraction of what is required by ordinary calico printing.

As the oil color has a natural affinity for cotton, it is not necessary to mordant the calico before printing, and the preparation of cloth, as in the old process, is omitted.

The fine art of color mixing, together with its requisite skill and expensive labor, are dispensed with, and the necessary thickenings used in the old process are no longer required.

The enormous saving in cost of production due to the omission of these several processes and to the greater production can be readily grasped.

The cost of colors is, in most styles, considerably less than that of aniline and allied colors, in some cases the same, and in a few styles somewhat more, although the writer expects to reduce the latter to the same cost. It will be understood, however, that the ordinary process could not compete with this new process, even if the colors in the new process should cost over twice the cost of aniline and allied colors. The remarkable fact of the oil colors costing so little is due to the method of their application by the lithographic process, there being prac-

FIGURE 1.—FRONT OF PRINT WORKS.

FIGURE 2.—RAILWAY SIDING.

FIGURE 7.—WEST END PRINTING ROOM.

FIGURE 8.—EAST END OF FINISHING ROOM.

FIGURE 9.—WEST END OF FINISHING ROOM.

FIGURE 10.—MAKING-UP ROOM.

tically no waste of color. Any color left in the color box is put away for use again to be utilized at any period afterwards. Where buckets of color are used in the ordinary process, only quite small tins are required in this lithographic process. This is due to the penetrative power of an oil medium, and the fact that every atom of color put on the calico remains there and that none of it is removed from the fabric.

The process is so much cleaner throughout than ordinary calico printing, that the chances of damages and rejects are reduced to a minimum. There are no doctors used on the machine.

The colors improve with age, and, with rare exceptions, are quite fast to light, and have stood exposure to all weathers, during the hottest season, for four consecutive weeks, on roofs of houses in East and Central Africa. The colors, with rare exceptions, are fast to all ordinary washing, ironing, etc., and many resist soda.

The past difficulty, that these oil colors become hard and cakey on calico, has been completely overcome, and they are now as soft on calico as any other dyestuffs.

One of the most interesting developments is the absence of engraving. The designs are usually merely lithographically drawn on keyplates which are stored and kept, and when needed for use are transferred by a very simple new machine to the rollers and a perfect register obtained. The life of these designs is much greater than that of the designs on engraved copper rollers and long runs are accomplished.

After printing, the designs are at once merely washed off with acid instead of being turned off in a lathe, and it is a usual course to print from these same rollers the same day in other designs, owing to the rapidity and cheapness of washing off old designs and transferring new designs. When repeat orders come, the keyplate is taken out and the design is transferred again rapidly and at small cost, as often as required, upon the rollers. Hence the risk of sampling new designs by the lithographic process is very small, as it requires only a fraction of the expense in ordinary calico printing. There is no loss of metal in washing off

designs, and hundreds of designs can be transferred one after the other upon the same roller, whose life is almost unlimited. In this process the rollers are made in standard sizes, and are secured to a fixed mandril. Their weight is thereby much reduced and greater facilities are obtained in changing the printing machines from one design to another, obviating the present system of using loose copper shells and mandrils and accomplishing great saving both of time and money. As a natural result, fewer rollers are needed, infinitely less capital is locked up in printing rollers, and there is no depreciation of metal to write off annually. This fact alone, irrespective of all the other advantages, is sufficient to make this new process a revolution of calico printing, the cost and time of lithographically drawing being a fraction of the cost and time of engraving a copper roller.

The new process produces excellent printing, clean and with sharp outlines, and the oil color tends to strengthen the calico instead of weakening it, as is the case with aniline and allied colors. Moreover, in printing with copper rollers and aniline colors, owing to the great pressure necessary between the printing roller and bowl, and the many processes after printing, there is considerable punishment and drag upon the cloth. This undesirable feature is entirely eliminated by the new process, owing to the pressure necessary for printing being very light, and to the fact that the cloth is not subjected to these after processes referred to.

Further, whereas aniline and allied colors tend to gradually disappear from the calico during the life of the material, the oil color has a constant tendency to grip the fibre of the cotton more and more and to soak into it, and actually improves during the life of the fabric.

In conclusion, calico printing hitherto has been devoted substantially to the complicated, costly, and sometimes abortive, effort to induce water colors to adhere to cotton—a palpably unnatural thing. In this new process, all these difficulties disappear, and the color is applied in a form and by means which

make it natural and inevitable that it shall adhere to the cotton. The resulting revolution in calico printing should be easily understood by all.

Although this Association is assumed to be interested only in the phase of the subject applicable to calico printing, it should be said that this process is also applied to printing on other fabrics, as silk, satin, wood, jute, linoleum, oil cloth, and also to other materials, as well as to all forms of decorative printing on paper.

Although it is relatively new, the works are in full commercial operation, as is shown by the illustrations.

The SECRETARY. I should say further that we expected to have some specimens illustrating this method of printing, but they have not arrived, and perhaps the explanation may be the statement of the President that the author is away for his health.* We have received the following discussion on the same topic by Mr. ROBERT A. S. REOCH, superintendent of the Cocheco Print Works of the Pacific Mills, Dover, N. H., who is unable to attend this meeting.

Mr. R. A. S. REOCH. We are intensely interested in this new method of printing which has been so ably presented by the inventor, Mr. J. A. JEFFERSON HAYES of England, and we trust that the paper which has just been read has proved of interest both to those members of our Association who are engaged in the printing industry, and also to the many who are not immediately identified with this branch of manufacturing, and that they may have been able to form an intelligent opinion of its merits and determine to some extent at least, the value to be attached to the extraordinary claims set forth in its behalf.

Mr. PRESIDENT. Permit me, as a printer, to congratulate you and the Committee having in charge the preparation of the

* Since the meeting the samples have been received, and this Association will loan them to any members for examination.—*Secretary.*

programme of this semi-annual meeting. As a rule the subjects brought before the Association have been of very little interest to printers, dyers, and finishers. We have no wish to depreciate in the slightest degree the manufacturing end of the cotton industry. All honor to the men who by their skill, inventive genius and untiring energy have placed our manufacturing establishments so conspicuously in the foreground. But, gentlemen, do not fail to recognize also the tremendous importance attached to those industries whose special province it is to beautify, embellish and adorn the fabrics that come from the loom. Do not overlook the artistic skill required in the creation of beautiful designs, or the scientific ability necessary to produce those wonderful color effects which rival nature itself by their marvelous richness and splendor.

We therefore hail with delight the fact that this branch of the cotton industry, which is so intimately associated with the manufacture of the cloth, is to form a part of the programme and we trust in the future it will have a more prominent place in your deliberations.

With these few introductory remarks we will now address ourselves to this new method of calico printing. At the beginning we wish to say that we have very grave doubts of the ability of the inventor to make good his claims, and to our minds printers need not be unduly alarmed lest the millions invested in the various machines, materials and methods of a modern print works should suddenly shrink in value to the vanishing point and the plant and machinery become worthless and fit only for the scrap heap.

No such fears need for a moment be entertained. Gentlemen, we do not say this in any spirit of antagonism or feeling of prejudice. We are not hidebound or wedded to old theories or methods. Printers can never be standpatters in the industrial sense and ***printing*** is one of the most progressive arts that can be named. The novelties of today are in a sense the antiques of tomorrow. We do not for a moment believe that perfection in printing has been attained or the last word spoken.

While we know something about this new process, still we do not know enough about the fine points involved to either commend or condemn it unqualifiedly; but we do know something about the present methods and the degree of perfection attained both in printing and engraving. The delicacy and beauty of design, the brilliancy and fastness of colors produced, leaving the fabric soft and natural in feel and texture with strength unimpared, have been attained gradually, step by step, and have taken the skill, science and experience of more than a century to reach its present high state of development.

In 1785 the method of continuous printing with engraved copper rollers was invented by a Scotchman named THOMAS BELL and successfully carried out by him in Lancashire, Eng., and we find that by the year 1800 the new industry has been firmly established in Great Britain.

Hardly a year has passed that has not produced numerous improvements and inventions, but the fundamental principle has remained the same. We welcome every improvement either in machines or methods. The resources of the universe are boundless. Invention and discovery will go on and it would be foolish to assert the limit had been reached in the art of printing, but while machines, methods and processes change, fundamental principles are in a measure fixed. For example, we cannot conceive of continuous printing without the pattern being produced from a cylindrical roller and this feature of the present mode of printing has been adopted by Mr. HAYES and applied to the lithographic style of printing and this in brief is the sum and substance of the new process.

The machines, however, which are used for lithographic printing are very intricate pieces of mechanism and operators who can run two or three color machines receive for their services $30 to $50 per week, and as a rule they are a difficult class of people with which to deal.

Perhaps it would be more to the point if we should take up in regular order some of the claims of superiority which the inventor sets up and which we think in most cases cannot be

sustained. In general our criticism of these claims might be grouped under three heads, viz.: Quality, Quantity, Economy.

Under the first head broadly speaking we would name superiority in results obtained, both as regards sharp outlines in printing, clear whites, fast colors and general excellence in finish and workmanship. No method is worthy of consideration unless it not only maintains but improves the high standard already attained. Lowering the standard of quality will not be tolerated at any price, and we are sorry to say the samples we have seen that were printed by the lithographic process are quite inferior both in delicacy of design and sharpness of outline, while the solid parts of the pattern are lacking in solidity and uniformity, presenting what printers call a mealy or broken appearance. The whites are also soiled and show innumerable little specks of color picked up from the plain parts of the aluminum tubes in printing and we believe this will be hard to overcome and is one of the great drawbacks to lithographic printing. With regard to fastness of colors we take very emphatic ground in favor of colors produced by present methods rather than those produced by lithography, and maintain they are faster to light and exposure, faster to severe soaping and scrubbing on washboards, faster to soda, chlorine and other chemicals, and faster to regular wear and tear. This is a question that is easily susceptible to proof, and can be readily demonstrated.

The new colors are insoluble and are mostly lakes and pigments ground in linseed or other oils. They are applied topically to the cloth and easily rub off. In fact they closely resemble our pigment colors, which is our lowest type of printing and which requires less skill than any other class of work. By our present method of printing we can use either fast or loose colors, pigment or aniline colors, Alizarine or Indanthrene colors. We can print mordants which are not colors in themselves, but when afterwards dyed give us the fastest colors known, such as Turkey red and similar colors. We can print resists and discharges. These and many other classes of work

can be printed by methods at present in vogue, but this new process of printing is absolutely restricted to one style of work and that is colors made from lakes and pigments ground in oil.

Printers therefore need not be apprehensive that the days of calico printing are numbered. Its scope is unlimited and its field of operations, even under present conditions, is continually extending.

Under our second head, quantity, we will now briefly consider: production per machine, speed at which machines run, time consumed in changing colors, and change of patterns, etc. Here again we take issue with Mr. HAYES and maintain that our present printing machines can run at a higher rate of speed and turn off more and better work than can possibly be done on the new lithographic printing machines, and in this our statements are borne out by the testimony of lithographic printers themselves. The loss of time in changing colors is insignificant when compared to the new machines and what is true in respect to change of colors is much more so in change of patterns. Lithographic printers simply smile at these wonderful claims of Mr. HAYES.

We may excuse him to some extent by remarking that in all probability his knowledge of such matters is confined to the product of English printing machines. He would perhaps change his mind were he more conversant with American methods. But in all seriousness, from what we know or can learn of the two methods of printing, it is simply preposterous to set up a claim of larger production for the new process.

We now come to the last division, economy of production, and here again we question the accuracy of his claim, and in directing attention to this branch of the subject we must necessarily include the two divisions already discussed. Superior quality means higher prices, and increased production means lower costs. Indeed this question of production has more to do with cost than almost all the other items combined. Instead of engraving on copper rollers, patterns are transferred by photography and other means to aluminum tubes. The

impressions taken require frequent renewal and call for the services of high priced workmen. Lithographic printers as already stated receive very high wages and skilled men of this character are difficult to obtain at any price.

To our minds the saving claimed by eliminating the processes of ageing, steaming, soaping, and washing off after printing is more than offset by the higher priced labor and the reduced product. Much stress is laid on the amount of capital locked up in copper rolls, but do not overlook the fact that 50 per cent. of this can be obtained at any time for old copper. How much it costs for imported lithographic stone at 20 cents to 35 cents per pound we cannot tell and to this must be added the aluminum plates, tubes, and the many patented machines and appliances to which Mr. HAYES refers. All this additional expense will help very materially along with 50 per cent. reduction for old copper to equalize the cost of copper rollers. Then when we take into account the extra stretch or gain in yardage obtained in running the goods through the various operations after printing, as opposed to the single process of loose hanging, the saving claimed for the new method of procedure is reduced to the vanishing point.

Gentlemen, — when we consider the fact that probably over 50 per cent. of all the goods printed in the United States by commission printers do not command more than 1¼ cents per yard, this including shirtings, percales, and the cheaper grades of lawns, you can readily understand that this new form of printing cannot compete at such prices and lithographic printers are simply appalled at such low rates.

Please do not misunderstand our position in this matter. If there is genuine merit in this new process, it will create a field for itself, but on account of the low prices which prevail, I feel reasonably sure that it will not be in the regular lines of work which cover more than 75 per cent. of the entire business. Draperies would naturally be its most fitting field of operation, but even here there are serious drawbacks.

To print over six colors would require a very large machine

which could not be operated to advantage owing to its being so complex. In addition to the feed rollers which furnish the color to the printing roller, and this apparatus is much more complicated than the color box and furnisher of an ordinary printing machine, there are a series of moistening small rollers which dampen the printing roller before it comes in contact with the color, and this dampening process is just as important and perhaps more so than the application of the color itself. The antagonism of grease and water is the basic principle of lithographic printing and each individual printing roller must have its series of moistening rollers as well as its color box and color distributing rollers. On these points we need not enlarge but refer to them merely to show that this new method of printing is much more complicated than the old.

There are other claims set forth in the prospectus which we cannot take time to discuss and in conclusion would say that we will listen with pleasure to any explanations Mr. HAYES may make which may tend to elucidate obscure points and solve some of the difficulties which present themselves, and which we have tried to bring before you.

Mr. DANIEL J. DANKER. Mr. President, I had an opportunity to see this process in England a year and a half ago. I have taken a few exceptions here to various claims which Mr. HAYES makes. He states (page 82): "In most cases, after printing by the lithographic process, the calico is merely hung and then finished." I think that is the weakest thing in the whole matter. I went to the plant, where they have had many people to look at this process, or try and see it, and they were very secretive about it. At that time they had interested a lot of German money in the enterprise. As we came up through the shop we saw a lot of sheds such as a tannery would have, similar to those used for the loft-drying of sheetings. In talking with the people in charge we came to the question of speeding machines. They said they could speed them up to almost any rate and air-dry the goods. I do not think it can be done. If

I was going into that process I should like to find out how much area I would require for drying for the production from a given number of machines running at sixty yards a minute. If you are running sixty yards a minute on a printing machine it is necessary to have a supplementary equipment of drying machines to take care of the output at the same rate; and with this process I question whether the cloth could be dried to take care of the printing at such speed, even though a very large area was taken for drying. It is no use to print unless you can dry the cloth at the same speed. So it seems to me that his process of drying is the weakest point of all.

He speaks about eliminating "the fine art of color mixing, together with its requisite skill and expensive labor." I do not think he will ever eliminate that, unless he has some lithographic ink company that is going to mix up colors and sell them. If that is the case you are going back to the dark ages. Every company today wants to get back to the rudiments and compound them for themselves.

He speaks about the saving in the engraving. The most important part is the original sketch, and then there is the transferring to the lithographic stone. Lithographic engraved rolls do not give you a depth of engraving, and regardless of what he says you cannot get production equal to what we get by the ordinary printing process. In England, where they run short runs, it is all right to have lithographic or photographic process, but over here we have long runs and we want depth of engraving. You cannot get it by lithographic process.

He talks about registering. Judging by the work we saw in his place — I am only discussing this as a layman, but I had one of the best engravers in the United States with me, and I would not consider it good work. Lithographing has made its great advance in paper, and all the paper used is coated with casein so that when the lithographic stone is put on the paper the ink will not bleed or run.

He talks about the absorbing properties of cotton. Yes, it will absorb and give you blurred work. You cannot get clean lines as you can in printing.

He claims that the cost of colors is "in most styles considerably less than that of aniline and allied colors, in some cases the same." I do not think you can get anything as satisfactory as we are accustomed to by this process. You cannot get the same tone of colors from pigments that you can from anilines. If you could, they would be in use today. The goods printed by this process have a rather metallic or papery effect. If a woman is going to have a calico dress, she does not want colors like a billboard, and they do have that kind of lustre.

I saw the works at Southampton and I also saw the original process which Mr. HAYES' process was adapted from. That was at Lisieux in France. Of course that was entirely out of the question for practical use.

Mr. HAYES mentions its use for draperies and tapestries. That is the only place it could be of any use, where you have got short runs and the absorbing does not do any harm; in fact it really makes it more artistic.

He talks about its being a much cleaner process and that there are no seconds. I defy any man in a print works to have no seconds. When I was over there they were going to put calico printers out of business. They had a lot of cheap cloth, 52 x 64, hung out in the yard, that they had printed a few days before and were letting it dry. Cotton is absorbent to those oil colors and it will run or bleed somewhat. I doubt whether they can get any production from their dry room.

He talks about depth of rolls and registering and penetration. I think on a lot of those cheaper cloths the oil colors might go through, and of course you have got to let them dry and cool out there in the sheds.

He talks about aniline colors disappearing from the calico trade. They will never disappear. The aniline business, with the newer type of colors, such as Indanthrene, will be developed to a much higher state of perfection than it has reached today. This going back to pigments and air-drying is going back fifty years.

Recently, I understand, Mr. HAYES has taken over somebody

from the Calico Printers' Association, and this has given the process a little strength in England.

The PRESIDENT. This is a very interesting subject. I wish Mr. HAYES was here to explain the process further.

Mr. DANIEL J. DANKER. I wish he was. I would like to learn something myself. He may have made some advance in a year.

The PRESIDENT. Of course I have absolutely no interest in Mr. HAYES or his process, but I happened to go out to this place at Letchworth, just before I returned from England, about two weeks ago, and it is a very great question just what they have got there. Superficially it does look as if the process had some value, but it all depends upon the quality of the work. I do think if they can get out the quality of work — which of course is a big " IF "— if they can get out the quality of work, they can make good on some of these other claims. They claim they have a new process or were just perfecting a new process of drying to obviate the necessity of hanging the cloth in these big sheds. To my mind that is the most serious objection — to hang all the product of any large print works in a shed would be more expensive by far than these processes which they eliminate, which are, after all, almost antomatic, because they require very little handling. But this much must be said: they are going ahead and forming a company — although they have not actually raised the money,— and I think those of us on this side who are interested in calico printing will watch the outcome with a great deal of interest. The Hayes Company will sell out its patent rights for England for £200,000, and they are to erect a print works of twenty machines, and they say they have promises of a considerable amount of capital. This Mr. CHRIS WOOD, whom you referred to, is one of the leading men in the Calico Printers' Association, and what you say about the C. P. A. is undoubtedly true — they have passed through a

great many reorganizations — not financial reorganization, but reorganizations of their methods of doing business. Mr. WOOD impressed me as being a very able man and I think he believes that there is something in it. At any rate they are turning out this cloth on a commercial scale. They are taking orders and turning out several thousand pieces every week at this plant, and somebody is taking it. I do not know what they are getting for it, what the commercial end of it is, but at any rate they are doing it in a small way. So far as the class of workmen, instead of having lithographic printers or machine operators, whatever they are called, one man who is working on a machine is an ex-barber, and another was formerly a railway porter, and they have no practical calico printers there. Mr. WOOD believes that when they get experienced calico printers to run the machines, they will do away with a great many of these imperfections. But the points that are made by Mr. REOCH and by you are exceedingly important, and I doubt very much in my mind whether in the near future they will get a quality of work to compare with the quality of work done by the present method of printing.

Another thing — this process at best, as Mr. REOCH brings out clearly, can only turn out a small proportion of the entire product of calico print in this country. I do not know, of course, how far it may be developed, but granted that it can do all that they say, there is still a very large part of the business that must be done by present methods unless they develop this a good deal farther than it has gone. Are there any further questions or suggestions? I do not want to put myself in the place of the author of this paper, because I know nothing about it; I am not a practical man in this line.

Mr. DANIEL J. DANKER. Did you have a chance to see anything?

The PRESIDENT. Yes, I went all through the plant and saw every machine and I saw every process.

Mr. DANIEL J. DANKER. They have been carrying it along in a very secretive way and HAYES' health has broken down two or three times. When we went there he was in France and we saw Mr. REYNOLDS.

The PRESIDENT. Mr. REYNOLDS is still connected with them. The plant itself is nothing. It is not even built in the characteristic England style; it is only plain sheds.

Mr. DANIEL J. DANKER. You know two thousand pieces a week does not amount to anything in England because they have such a market. Here the home market wants everything clean and bright. You cannot put out anything that the register is not right on, unless you want to try to imitate block printing. England is peculiarly situated to take up a special process on account of its varied market. In this country if you hand out something that is not quite up to the standard, they think you are crazy — they think you are selling them seconds.

The PRESIDENT. That leads me to say, if I may be allowed to make a remark, the suggestion made by Mr. REOCH was not prompted by me in any way, in mentioning the importance of the whole finishing end of the business. We, of course, are a society of cotton manufacturers, but of course that includes all the finishing processes, and to my mind, while there is a very great interest attached to cotton manufacturing and to the cotton mills themselves and all the processes and the development of those processes and the perfecting of them — to my mind the biggest single field is in the finishing of cotton goods, and I believe that the future has in store a great deal in those lines. I really wish we, as an Association, could do more to stimulate interest in the technical side of the finishing of cotton goods, and I wish that we could have more papers and a freer discussion of some of these things that relate to the finishing end of the business. I heartily second the suggestion made by Mr. REOCH and I hope in future meetings we shall have more

papers on this side. They are of interest to us all, because, after all, even those of us who are making grey goods can only find a market through having the goods finished, either by the customer or by some printer or bleacher.

Mr. J. A. JEFFERSON HAYES. (Received since the meeting.) With regard to the points which have been raised, I have much pleasure in giving you the following information:

DELICACY OF DESIGN.

It naturally follows from the use of lithography that the delicacy of the design is more marked by the lithographic process than by the ordinary process of calico printing. Lithography, as all are doubtless aware, is a higher class art than calico printing, so that since lithography has now been successfully applied as a commercial proposition to the printing of cotton and other textiles such as silk, wool, linen, jute, and the like, it naturally follows that the art of calico printing has been raised to a higher level, and the cheapness of the production of designs of the highest class of the most delicate workmanship has produced styles hitherto out of the question in calico printing as a commercial proposition.

SOFTNESS OF THE FABRIC.

The lithographic color has a tendency to protect the fabric instead of damaging it, as is the case with the use of aniline and other colors; and further, as I use less pressure in my printing than the ordinary calico printer uses with copper rollers, the cloth remains generally softer and in a better condition, and as the cloth goes through less processes the white of the cotton remains purer. In other words, mine is an altogether cleaner process, and I think anybody who went over our works, and compared it with a calico printing works as known today, would at once admit that the whole process is cleaner.

SPECKS OF COLOR.

There is no trouble through this cause, provided the color is in the correct condition for printing. In all printing machines, by whatever method, success of course is dependent upon obedience to known rules, such as correct pressure, and correct state of color, and of course there are rules now duly established which have to be obeyed in our process also. So long as these rules are obeyed, printing is a very much easier method from aluminum or zinc tubes by lithography by our machine than is calico printing by copper rollers, and the chances of bad printing are much less.

RUBBING OF COLORS.

We have no trouble whatever on this score.

RAPIDITY OF PRODUCTION.

I think as regards rapidity of production, it may be taken for certain that as compared to the production of a calico printing machine, my machine must of necessity give a greater production. The speed at which we print is much the same as the speed of an ordinary calico printing machine, and the rapid means of changing colors and designs increase greatly the production. When applied to paper, and as compared to the production of ordinary lithographic rotary machines, our production is of course many times greater.

COMPLICATION OF THE MACHINE.

Our printing machine is very much simpler in every respect than the calico printing machine, and much easier to handle in every way. As compared to the lithographic flatbed, or the lithographic rotary machine, the simplicity of my machine is most striking; indeed there is no comparison possible. I think one may say that what is most striking about my machine is its extreme simplicity, which is due to the principle on which it is built, and which makes lithography possible from tubes in multi-color on a commercial basis.

I am, of course, quite aware that lithographers have had many difficulties to contend with in endeavoring to apply the printing of lithography to continuous textiles, especially cotton. But the fact is, I have had the good fortune to get over all these difficulties, from the simple reason that I have ignored entirely the known laws of lithography, and the known construction of lithographic machines, and have produced a machine of a totally different nature and this construction has had the effect of bringing the lithographic color upon the cotton in a state totally different to that state which is possible to a lithographer in the ordinary way. It would be too complicated at this period to explain the reasons of this, as they are due to many causes arising from the novelty of construction which handles the color, quite differently to the manner known to lithographers. This change in the state of color is also an absolute advantage for paper printing, and enables super-position of color to take place while the color is wet, a possibility disputed by all lithographers, and which is now proved to be absolutely possible, *provided* the color is in that state which is obtained by my machine and by the correct use of this machine.

I shall be glad at some later stage, if desired, to amplify this information.

The PRESIDENT. If there is no further business to come before us this morning, we will stand adjourned until 8.15 this evening.

THIRD SESSION.

TUESDAY EVENING, SEPTEMBER 10, 1912.

The Association met at 8.15 P. M., President GREENE in the chair.

The PRESIDENT. The members will please come to order. Mr. W. H. SMITH, Superintendent of the American Textile Company, of Pawtucket, R. I., has prepared a very interesting paper on the Importation of Skilled Labor, but Mr. SMITH does not feel able to read his own paper and Mr. WOODBURY has very kindly offered to read it. I hope attention will be given to this and any questions that you may have to ask afterwards I will be very glad to answer for Mr. SMITH after conference with him. I will ask Mr. WOODBURY to begin by reading this paper.

THE IMPORTATION OF SKILLED LABOR.

WILLIAM H. SMITH, 625 East Avenue, Pawtucket, R. I.

In introducing an industry into a new field, or in extending one to the manufacture of goods of finer grade, it is vitally important that men trained in the processes of the particular manufacture should be available. Now the source of such a supply naturally lies where the finer goods are already being made, where the industry has taken root. If for any reason this existing supply is not available, the manufacturer must do as best he can with inexperienced help. This means that he is bound to have trouble. He may gain, finally, all the accumulated experience that is an important asset of any trade. But meanwhile repeated delays and costly experiments hinder his progress. He finds defective goods to be the rule rather than the exception in his case. At the same time, the pioneer has to compete with successful rivals long established in the original home of the same industry. Evidently, his path is beset with many obstacles. These have been made manifest to the writer at first hand, in a particularly interesting way. During the last dozen years, he has had occasion to observe closely the development of a new industry. That this industry has not already suffered complete disaster is due only to the protection of a high tariff. The production of inferior goods has caused a useless waste of capital; late deliveries have caused an unfavorable impression on merchants kind enough to place orders. These meagre results are due solely to the lack of skilled labor. That such labor should have been debarred from entry at our ports when it was really indispensable to the success of struggling concerns has seemed in many instances nothing short of criminal.

It may be well to state briefly what we usually understand by the term "skilled labor." This term does not necessarily imply dexterous individuals, nor does it, on the other hand, necessarily exclude this idea; it means rather a number of laborers possessing the aggregate knowledge of methods practiced in the locality where they have worked. It is the accumulated experience that counts in the new locality. Nor should such an equipment be presented by one, or by a few men only. Obviously, one or a few men with a large class of apprentices whom they are delegated to train cannot make a contribution to the success of the enterprise equal to that of a smaller total of skilled laborers.

Two or three of the fields in need of foreign skilled labor may be mentioned at this point. Since this paper is addressed primarily to cotton manufacturers, we should note that the spinning of cotton yarns in fine counts is not yet carried on successfully in this country. There is considerable demand for these fine yarns; in the insulation of electric wires, for example; also in the lace trade, and in several other lines. Now this industry is not developed because there is not labor here skilled enough to spin such fine numbers. At the present time, therefore, manufacturers in these industries demanding fine counts are compelled to import in large quantities all the expensive cotton yarn. Similarly, the progress of the lace trade would be much more rapid if the supply of skilled labor were not curtailed. The manufacture of fine woolen goods is checked in much the same way as that of the cotton yarns just mentioned. Finally, fine glassware is also controlled almost exclusively abroad.

We now see how vitally interesting is the question of importing skilled labor for the development of domestic trade in all higher grade goods. Indeed, our legislators, foreseeing the necessity for that importation, have provided for a proper supply, in Section 2 of the Immigration Act of February 20, 1907, which reads as follows:

"And provided further, that skilled labor may be imported if labor of like kind unemployed can not be found in this country."

Nevertheless, this proper supply of skilled help is not available today. The reason for this is that the intention of the legislators is thwarted most effectively, not by the heads of the Department of Commerce and Labor, but by the commissioners and members of the Board of Special Inquiry who appear to consider it their duty to exclude all the skilled help they possibly can, using any means to do so. The weapon which they are able to use for this purpose is the presumptive evidence clause. With that instrument they can do almost as they choose. Moreover, until some provision has been added to the present rules regulating this instrument, the existing outrageous conditions will remain with us, actually preventing the application of the particular feature of the law intended to meet the need which the legislators had in mind when they added the clause, "provided further, that skilled labor may be imported if labor of like kind unemployed can not be found in this country."

Several forces act in concert with these officials to keep skilled help from our shores. The important ones are the foreign manufacturers, and the labor union — both domestic and foreign. These influences combined present a very formidable front. The foreign unions and manufacturers are waging a war that we can all condone, for our gain is their loss. The American union holds blindly to the one idea of keeping out labor competition, and by this very action is stunting its own development; but that representatives of the government should form a part of such a combination, and thus prevent the development of new industries, is an anomaly that should need only to be exposed to cease. Unfortunately, such is not the case. To remedy the existing conditions there will be required very strenuous and combined action on the part of men who enjoy the confidence of the lawmakers of the country, who are interested in the development of home industries, and who will acquaint themselves with the facts.

The unscrupulous methods of foreign competitors are worthy of mention. One frequently sees advertisements in the daily papers of the lace centers in Europe, warning all persons who

have received inducements to emigrate, or who are thinking of crossing on their own initiative, that they will hear something to their advantage by calling at the offices of the unions or of the manufacturers' associations. Any luckless wight who takes advantage of this offer has his ears promptly filled with awe-inspiring fiction which would be amusing if the effect were not so disastrous; for the tales of cruelty and enslavement, of imprisonment at Ellis Island with loss of time and money, and the many other horrible details which may be conjured up regarding a distant land, cause a revulsion of feeling in our hero which brings him to a speedy decision against any such risky venture.

As things are now administered at local immigration stations, it is absolutely unsafe for a skilled operative to leave his home on the other side with the idea of seeking work in this country. Some manufacturer, or envious fellow worker, or other interested person, may send a letter or cablegram, the means for transmitting this being invariably the local branch of the union. This message is received by some branch union of the same industry in the United States, where the insinuation that the worker is coming under a secret agreement is gladly seized upon. Consequently the word is passed along to the immigration station where the man intends to land. Of course, all the facts appear to confirm the message, for the man is on board, is going to the locality indicated, and will probably seek work at the firm that presumptively induced him to come out.

These facts will be better appreciated when a few specific examples have been given. The writer wishes first to tell of an interview that he had in connection with a case which interested him two or three weeks prior to the end of the last ROOSEVELT administration. In this case there were the usual elements of bitter opposition to the landing of skilled help by the immigration officials. After a description of the joint efforts of three labor unions — American, French and English — aided by a commission of French manufacturers who were determined to prevent the development of the lace industry in the United

States, the senator to whom an appeal for help had been made was so astonished at what was transpiring that he suggested submitting the facts to the President. For that purpose he secured an interview with Mr. ROOSEVELT. The latter, after acquainting himself with the facts, expressed himself in substance as follows:

"We *must* get legislation that will prevent this iniquity, and so permit the entry of skilled help rather than that of so many undesirables. All this is wrong; it is just the opposite of what should be."

Let us now consider the specific cases. The first is that of a man who came to New York about eighteen months ago intending to seek work at Pawtucket, where he had a friend. He wrote to this friend from Liverpool to tell him of this intention, and of his sailing. At the local plant the letter was mentioned to a foreman, who spoke to the superintentent. The latter sent back word to the immigrant that no situation could be promised until he applied. When the immigrant arrived at New York he received this message. He admitted to the board, on examination, that he was going to seek employment at the firm in question. This confirmed a message which the immigration officials had received from the Union. In this particular case, upon being notified that a hearing of a board of inquiry would take place the following morning, the writer attended the court at Ellis Island, and had the assurance given him by the president of the board, after adjournment, that the man would not be deported without further inquiry. At the time, the company supporting his defense had a number of machines, costing about $7,000 each, standing idle for lack of just that kind of help, and orders months old on the books. These facts had all been presented to the board of inquiry. Moreover, there was not a shadow of evidence indicating that any communication, direct or indirect, had taken place between this man and the company. Hence, his case seemed to be quite clear, his right to land indisputable. Yet, on the next morning, to the company's utter astonishment, in spite of the promise of further inquiry made by the president

of the board, the man was put aboard the St. Paul, and deported as contract labor.

A little later, three men and their families were taken to Ellis Island on their arrival. One of these had worked in the United States for seven or eight years, and had several children born in this country. These three men, having come entirely at their own risk and expense, felt outraged at the order for deportation and at their long detention consequent on the appeal to Washington. Not until one of the senators had used his influence to bring the facts of the case to the personal attention of Secretary NAGEL, were they finally landed. The Secretary states, in one of his interviews with the senator, that the man with several children born in this country, who had gone away for a short time only on account of his wife's health, had the obvious right to return. Further, there was found against him no evidence whatsoever of inducement or contract. Now the interviews in Washington, secured through the courtesy of representatives from the state, were obtained at the cost of much time and trouble for all concerned. As a matter of fact there is no statute which prevented these immigrants from landing, since this kind of labor was not obtainable at any price in this country, in which case the law provides that it can be legally imported. Finally, in the instance just given, the efforts made by certain officials to debar these men were so disgraceful that when reported to the department at Washington this attitude actually helped the men's case far more than any merely negative proof which the company could offer in their behalf.

Another case well illustrates this point. This man was about thirty years old, competent, and the owner of several hundred pounds sterling. With the view of improving his prospects, he gave up his trade to try farming in Canada. But circumstances did not favor him, so that when a good opportunity of selling out presented itself he seized it, and decided at the same time to try his chances in the United States. Incidentally he had relatives in New York state. He was successful in obtaining employment as a lace weaver, his former trade. However, he

had not been many days at work before some union man denounced him to the immigration officials as having been imported under contract. He was therefore arrested, taken from Pawtucket, R. I., to Ellis Island, and detained there for eleven weeks. It was the Hon. C. E. HUGHES who represented the company in this case. So clear and so final was the evidence proving that this man had had no correspondence whatsoever with the company employing him that the then Secretary CORTELYOU found it necessary to overrule the Commissioner and to allow the man to land. The total expense entailed, exclusive of the loss of time, was about one thousand dollars. Moreover, there was, of course, no compensation to the man for his arrest, for the loss of eleven weeks' work, nor for his degrading detention in company with repulsive immigrants of the most destitute class.

Notwithstanding the obstacles which stand in the way of manufacturers who desire foreign skilled help, some measure of success has been realized in bringing in, during the present year, a considerable number of lace makers.

Some of our own members may be interested to hear what information the writer has gathered regarding the means of complying with the law. In the first place remember that the only condition on which contract labor may be imported is that " labor of like kind unemployed can not be found in this country." To satisfy this condition it is necessary to advertise in the local centers where such help is likely to be found. Copies of the advertisements and receipts for their insertion should be kept. Notice must be sent to the Commissioner of Immigration that certain individuals are expected to land at his port. The following items must accompany this declaration:

The names and profession of the workers;

The name of the ship on which they are coming, with its port of clearing;

The advertisements and receipts for same;

A statement of the steps taken to secure such help in this country;

Affidavits with particulars regarding the lack of help in this country.

These are the steps which the department advises. Some intelligent person must be sent to meet the boat. In case the immigrants are detained this person should request the Commissioner of Immigration for permission to attend the session of the board of inquiry at which the immigrants are to appear. This will furnish an opportunity for testifying in behalf of the men who are detained.

If the board decides for deportation it will be necessary for those involved to file appeal blanks. It is the duty of the officials to bring these blanks to the attention of each of the individuals who are ordered deported. The Commissioner of Immigration forwards these appeals to the Secretary at Washington. It is advisable for the manufacturer to send a letter at the same time, stating his side of the case. In most instances it is not essential to employ legal talent, for when the spirit of the law has been carefully observed, together with the other precautions just mentioned, the appeals will generally be sustained on their own merits.

It may not be a waste of time when planning to meet a boat to get in touch with the landing agent of the steamship company. This officer, acquainted as he is with the personnel of the immigration station, can sometimes give time-saving and really valuable directions.

An exhaustive treatment of so vital a subject is hardly possible in a paper of this scope. Our main object has been to state the problem and to emphasize its importance. If we have accomplished this aim, we trust that the attempt will have been worth while.

The PRESIDENT. Are there any questions which anyone would care to ask in connection with this paper? This is an extremely interesting subject and one, I think, to which all of

us must give more attention in the future. If there are no questions at this time, I am sure Mr. SMITH would be very glad to talk with anyone later on after the session this evening. As long as we have a fairly full program we will pass on to the next paper at this time, Present Day Relations between the Foreign-born Operative and the Mill Management, and it gives me great pleasure to introduce Mr. ARTHUR H. GULLIVER, of Norwich, Conn.

PRESENT DAY RELATIONS BETWEEN THE FOREIGN BORN OPERATIVE AND THE MILL MANAGEMENT.

ARTHUR H. GULLIVER, Norwich, Conn.

With the opening of the Panama Canal in the immediate future the cotton manufacturers of the United States are facing problems that up to the present have not been placed before them for consideration.

The control of the markets that will be supplied by the tonnage which will use this canal as a highway is already largely in the hands of our manufacturing competitors.

For many years England and Germany have devoted all their attention to exploiting to their own advantage the unlimited market in the countries whose people have never devoted time and attention to the consideration of fabrics made of woolen, worsted and cotton.

The settled policy of the manufacturers of the above countries has for years, and we might almost say for generations, been to devote themselves to the thorough mastering of the details required to secure and control the markets of Central America and the various countries of South America.

It goes without saying that England, with her overweening interest in both India and Australia, cemented by ties of blood and relationship, will call the full force of her armored ships and equipped men whether the control is menaced by sea or by land by any of her competitors.

From current reports in the telegraphic columns of our daily papers, we note that several of the countries that have not been

considered as possible competitors in the world's markets for textiles have secured, by option at least, coaling stations on the islands in the Pacific which will enable them to carry the largest possible cargo of merchandise to whatever markets their lines supply, thus saving all waste space formerly used for fuel.

The question of the toll that is to be charged to foreign ships for the use of the Panama Canal does not really mean any large amount of favor to be shown to the ships which fly the flag of the United States.

We all know, as members of the Association, that the larger amount of cotton fabrics that are now supplied to Mexico, Venezuela, Peru and the Argentine Republic, as well as the other countries of South America, are marked "American made goods" in large type on the original package, and with the smallest possible lettering that will be decipherable the sorrowful tale of "Made in Germany," or made in some other country informs the curious, but not the purchaser, that the market that is ours by inheritance and by favorable location has been absolutely usurped by our competitors.

If we have been correctly informed, within less than twelve months there were no banking facilities for our centrally located strong banks in this country south of El Paso, Texas.

The conditions of trade which maintain in the Latin American countries require the banking facilities to be controlled in such a way that home manufacturers will be dealing with banks officered by the relations or by the immediate family of the firms who seek the trade.

The acquirement of banking facilities has been carried on without any loss of energy or time by both Germany and England, and today we confront an entrenched enemy in the mercantile centers of these countries.

Mexico, the capital of the state of that name, is practically controlled by German born merchants and bankers. Their relations with the people with whom they do business are cemented by ties of marriage and by long residence.

To meet their unremitting competition it is necessary for the

manufacturer of this country to follow the methods of trade which have been so successful with both Germany and England.

It does not seem as if the United States should have been so long blind to the tremendous opportunities for securing in addition to the control of the home market their fair share of the trade which their competitors have usurped.

To meet these conditions the operative class in the two countries of Germany and England are practically stationary. Class distinctions prevent change of occupation. The inherited skill and facility of manipulation which maintain in both England and Germany are very strong elements in the security with which they regard their required market.

The English cotton operative of Lancashire possesses not only his own cultivated manual and mechanical skill, but also inherits what has been bequeathed to him by generations that have been obliged by the class distinctions of the country to continue without cessation in the same employment.

The Emperor of Germany has devoted the ability of his statesmen as well as his manufacturers to secure cultivated brains and muscle to acquire the skill requisite to make Germany England's most formidable competitor.

Against these conditions the United States, with their inherited love of immediate attainment, have been obliged to pit the small brain and the years of grinding oppression of the immigrant class which has flocked to our shores. Our working class is drawn from the lowest class of farm laborers.

It is useless for us to expect that the conditions of thirty years ago in this country, with intelligence as well as industry the characteristics of our cotton operative, can be secured with the pauper labor of Europe, which has thronged our shores and gradually crowded the more intelligent immigrant to pursuits more congenial to his tastes and more remunerative to his purse, can be, in the short time possible between his arrival and the necessity of his earning a living wage, molded into the shape that will produce results in the operation of machinery at the same time economical, intelligent and satisfactory.

We have to face the fact that the poorly nurtured brains of these operatives of this class are to be our tools for meeting the more skilled competition of other countries.

Under these conditions does it not behoove us to devote more of our time and attention to the consideration of the conditions which will produce a satisfied, contented and permanent state among the operatives whom perforce we are obliged to employ?

Our southern friends have found that their unlimited reliance on the white labor of the South has been badly disturbed by the peculiar conditions which have allowed factitious prices for cotton to influence such labor in their choice of employment.

It is useless to deride and ignore these conditions. Our friends in this country who have chosen the poor white laborer know from bitter experience that conditions which they themselves have produced are surely more than likely to be permanent.

Each one for himself, the work they will be obliged to do to colonize and Americanize labor to meet the warmer climate and the primitive conditions of the South is our work in the North and the East and the Central States.

The decision as to the means and methods required to make our operative a live competitor of our foreign friends will depend on local conditions that each one of us has necessarily to solve for himself.

There are, however, broad considerations which the recent unfortunate, and in some cases disastrous, strikes in our own midst have brought very clearly before us; among these, the fact that we have not the chance to put off longer the decision which will meet and prevent such unfortunate occurrences in the future.

The relation of the operative in a small concern to the management and ownership cannot be duplicated in concerns large enough to be commercially successful.

England has solved in her own way this same problem. Her solution cannot be ours, as her conditions are widely different in all the textile industries.

Although there are, as we have already stated, no widely to be adopted rules of conduct, there are certain definite results which will have to be obtained, and the means for gaining these can be stated in general terms.

At the basis of all successful work in any industry is the condition of absolute fairness between workmen and manager, a mutual understanding of the relations that each hold to one another.

This can only be obtained by a change in the consideration of the human element which must enter into successful manufacture. It is absolutely necessary, whether the concern be large or small, whether its operatives are drawn largely from one nation or from various nations, that the individual should understand exactly the conditions under which he works.

Whether we appreciate the fact or not, it is nevertheless true that not a few of our most unfortunate strikes have occurred from the fact that the interpretation of the language of our country is not properly conveyed to the foreigner with his different brain power and different language.

It is necessary that we employ in positions of sufficient trust and responsibility men and women who consider that the amount that they receive and the duties that they perform are sufficiently valuable to continue in our service, and who are able to interpret without misunderstanding all orders and directions given by the management that have to be carried out to the letter by each operative to insure the success of the plant. The old trite saying that a satisfied operative is the only valuable one holds in this case perhaps as strongly as in any other.

From our experience of many years we have been obliged to increase our writing knowledge of various foreign languages. We have ceased writing elevator notices, change in time and change in wages in one language.

We have been obliged to use print that would be intelligible to the French Canadian, to the Swede, to the German, and more recently to the Italian and in various other languages.

Why should we pay so much attention to the minor details

that are carried out on these announcements when the most important matter of all, the thorough understanding of the work which the operator performs, and of the amount and kind, of remuneration he receives for the same, is absolutely necessary and should not be liable, through the services of a careless and ignorant interpreter, to convey to him such a confused idea that he is unable to tell when working by the piece or by the pound either what he got off, or, if he succeeds in keeping up the required production, how much he will receive.

We take the greatest of care that our force of employees shall be protected by satisfactory liability insurance from loss of employment or loss of wages caused by even minor physical injuries, and yet we leave to the mercy of chance the most important articles in our employment of each and every operative.

No concern can afford either to have a temporary or continuous misunderstanding with any of its employees, no matter how small the wages nor how insignificant the duties performed.

We all know to our sorrow in the past that many a successful mill has been temporarily suspended, and for some time seriously crippled by the withdrawal of the lowest paid labor.

It is fully as important that the minors and low priced women in our employ as well as the dollar a day men should feel that the amount they take weekly from their envelopes should not only be what they understand we agreed to pay, but that this amount should be regular and its receipt should be certain.

We cannot expect that any concern, large or small, fully officered or run on the lowest overhead expense, can secure satisfied employees, continuous product and contented stockholders unless its operation be continuous.

We have seen during the past few years the peculiar condition in which poor buying of cotton has reduced continuously successful concerns, and we have seen for many years how concerns, on account of their location and the competition for the lowest priced labor, have been reduced to the direst straits by underhanded transferring of doffers, spinners and back boys

by the paid agents of the different corporations who temporarily or permanently are short of this class of help.

We also require continuous employment of the same working force to meet on a fair basis the competition of our foreign competitors. We can never hope to establish in a republic a stationary class of operatives with no changes to better paid industries.

The greatest security today of our mills located in the country is the fact that on account of concessions in non-essentials such as gardens, location of houses, and certain farming privileges, the regular dissatisfaction which breaks out during the spring and summer in our city mills is almost wholly prevented.

We must consider, no matter what nation furnishes our help, that experience gained in the concerns over which we, individually as managers, preside must be the governing factor in the continued success of such plant.

We cannot expect that the trained brains as well as hands of our higher paid foremen can be duplicated even with the strictest attention in their several callings by the average employee in their departments unless such hand remembers only the fact that he came from the ship that landed him in New York immediately to the mill, that his children have grown up in the village, have married and settled in their own homes, and a fair proportion of them continue to be employed in the same plant which has furnished him a house and steady employment for many years. This permanent employment will result in loyalty to the best interests of his employer.

Such conditions will enable us to take a loss in our general body of operatives and fill all vacancies with untrained labor, which by force of circumstances worldwide we are compelled to employ, without noting the fact, unless it is called to our attention, that we have today five different nationalities where five years ago we had but two.

Gentlemen, I feel so strongly in regard to this point that I wish to emphasize the fact that our consideration, continuous and earnest, is required to so combine our suavity with our

business acumen that each of us as managers and guardians of the stockholders' capital will be considered by every man, woman and child in our employ as a personal friend and counsellor whatever the exigency, whether it be sickness or death, loss of property, or change of residence.

This intimate relation, which maintained for so many years in England with the guilds under whose control the various handicrafts were followed, must be duplicated in our textile plants of today. The brains and the capital of the management must be used with as much zeal for the well being of the operative as for the prizes awarded successful business enterprises by the stockholder.

It is also important for our success that we should interest even the humblest and least important of our working force in the fact that to secure permanent, steady employment, they should each individually consider the value of carrying out to the most minute detail the quality of work which will insure satisfied customers and repeat orders. If they understand that success depends more on their conscientious work than the ability of the sales manager our mills can be sure of continued demand.

We have heard for a great many months the shibboleth of "scientific management." We have been informed, until we are almost tired of hearing it reiterated, that our government in Washington is involving itself and every citizen and resident of the wide country where we live in a continued orgy of extravagance from the fact that business as conducted in the departments is not considered at all from the standpoint of the average business man, but from the exigencies of "red tape" brought down to us hoary with age from the early days of the republic.

We have also been told that our railroads are involving the money of their stockholders, increasing the bonded indebtedness, and loading on our grandchildren the debts which we ought to pay out of dividends.

All this we understand, without mentioning the names of the men who are the most energetic in emphasizing its value, could

be remedied and completely obliterated by "scientific management."

What does this new watchword mean? Does it imply that the brains and the skill and experience which for so many years have enabled the citizens of the United States to surpass the world in the product of steel, in the handling of battleships, in the producing of patented inventions to save labor and time, have been all these years misapplied? Are we to judge that our education of a technical grade has been so useless that we have wasted more than we have gained in our methods of applying it to every day business?

Surely this cannot be the case. To use the words of Lincoln, "it is possible to fool some of the people all the time, and all the people some of the time, but not all the people all the time." We are very much afraid with the zeal and industry which we know have been so steadily applied to make the average man believe that scientific discoveries of little moment contain the germ of future unlimited life, that we have reached the state where exploited print does not convince the man who uses his brains as well as his eyes to read the magazines and newspapers.

Scientific management we have no doubt can discover follies in any business whether textile or mercantile, as applied by the average graduate from our higher institutions of learning, but the fact of the continued success of our department stores, our railroads and steel mills shows us that perhaps the words rather than the method have been exploited by type.

It is a very important matter that "scientific management" should be applied not only to the building but the operation of every department of a good textile plant, but we are sure that such methods have been used not only within recent years, but in the past; that such methods are continually employed subject to yearly or more infrequent change as economy of space, economy of labor and economy of time demand.

In this connection we all today should consider very carefully what can be done in this direction for our foreign born operative.

We should consult his comfort as well as our profits in all our

arrangements. Far be it for me to say here that the time has come for any brand of socialism. It may be and possibly will be in the not far distant future. If it comes we should be ready to meet it, but we can prevent and perhaps postpone the carrying out of its inconsistencies by following out a sane, reasonable and economic method of "scientific management."

What does this mean? Primarily it means the economy of the only two possessions which every human being has subject to his own control, namely, his time and his experience. There is nothing else, money, houses, lands or any other personal possession, that he can retain if prevented by any or all of his fellows.

These two, being universal, should be rendered by scientific management the most valuable possible to the individual operative as well as the most commercially profitable to his employer. The way in which this can be done I will not take your time and attention to particularize.

In order to economize to the greatest extent the first possession, time, the building itself should be constructed to avoid any unnecessary handling of cotton in its various stages from one machine to the other.

This would hold whether it was manufactured in an old or in a new plant. In the old plant the competition between concerns has made it of vital importance that no building should be retained for use in any process of manufacture which common experience has rendered inadequate or too costly.

By these words I mean not only the question of the actual floor space for the use of machinery, but also the various dimensions of the building, length, width and height, which changes brought about by skillful handling of our competitors have rendered obsolete.

I would go as far as to advocate the bonding of an old concern which for any financial reasons was unable to call from its surplus or from the pockets of its shareholders sufficient capital to make the required changes to place such old concern on a par with its rivals.

Of course, in a new concern no association between management, ownership or engineering should involve the subscribed capital of innocent investors in any plan that would not be equal or superior in this direction to any structures that have been built in this country or abroad for the installation of the selected kinds of cotton machinery.

To further economize the time it is far better to neglect the ornate and decorative features of the building than to lose sight of the more important fact that each machine should be located to require the fewest motions possible to transfer by hand the material that is being carried through the machines from minute to minute and hour to hour.

Again, in order to enlist every operative, whatever his standing on the payroll, on the side of the management and the capital they must consider that their time is not saved or the motions of their muscles decreased for the sake of lessening the amount which is put each week in their pay envelope.

The exploiting by print, in the lurid style followed by many of our papers, any changes made to save time and labor of the operative, has too often resulted in the covert opposition of the most well meaning of our employees to any change that would decrease their labor.

They should have the point so thoroughly emphasized and understood that we, as managers, should receive their most hearty co-operation in all changes which result in making their work less arduous and the time in years that they are able to be remuneratively employed lengthened and made easier.

The methods that would be followed to produce the above results we all know from our long experience are very different in different mills and different localities.

We have to deal not only, as we have stated, with nationalities who have been brought up in a different environment, and whose ideas for years have been absolutely foreign to the operation of textile machinery, and who have ingrained in their nature a latent opposition to anything that is suggested by their more successful fellow men, but also the operative who has been

trained by rule of thumb to follow without thought the methods pursued by his father and his grandfather.

We never shall reach the position of acknowledged rivals and business competitors unless we follow to the end the conclusions that these economical operations will produce.

The PRESIDENT. Are there any questions which you would like to ask Mr. GULLIVER? If there are no questions I am going to take the liberty of altering the program slightly by calling on Mr. CHARLES R. TOWSON. Last night I emphasized, or tried to emphasize, in my few remarks the very important relationship between the employer and employee, and I know of no man in this country who has made a more careful study of this whole relationship than Mr. TOWSON, the secretary in charge of the industrial department of the International Committee of Young Men's Christian Associations of this country, who has had this subject very much at heart. We are fortunate in having him here tonight as our guest, and I have asked him if he would not in a very few words tell us what the Young Men's Christian Associations throughout the country are doing in the way of bettering and helping the relationship of employees to employers and employers to employees, and I will ask him at this time to speak very briefly to us and tell us something of the work in which he is engaged.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION IN INDUSTRY.

CHARLES R. TOWSON, Secretary, International Committee of Young Men's Christian Associations, New York.

Mr. President, I want to say that it is a satisfaction to look into the faces of those who are dealing with a program of this kind, filled as it is with the human element. In gatherings representing industry in this country today the human element is the dominant theme. I was recently in such a meeting of the Yellow Pine Manufacturers' Association in New Orleans, and at Scranton, Pa. I sat at dinner with fifteen hundred men representing the anthracite coal industry, and the theme was the same. We find all over this country that industry is having its thought centered on the human factor. Because of this fact I am glad to take advantage of the President's invitation and speak to you briefly upon the Young Men's Christian Association in relation to this theme.

I am sure some of you ask instinctively, "What business has the Young Men's Christian Association in a gathering of this kind?" Only this, gentlemen — because we are dealing with the human, and you increasingly must deal with the human. I know that the Young Men's Christian Association does not occupy an exalted place in the minds of many. I remember that business man in the Virginia town where I began my secretarial career, one of the directors, who when he first saw me—I was as tall as I am now—asked, "Is that your Young Men's Christian Association secretary?" and on being told that it was, said, "Why don't you get an old man or a cripple, or somebody that needs the job?" That is not an unusual conception of the Young Men's Christian Association.

We desire to get into the thought of the industrial leaders of this country a new conception of this agency. We would like to help you to a better understanding of its possible usefulness in industry; not the Young Men's Christian Association that exists only for the clerks, but that meets the needs of the men with whom you have to deal in your factories. I wish I could take you into some of the steel centers, such as Gary, Indiana, where we have a $240,000 building, the gift of the chairman of the Board of the United States Steel Company but supported by the company; to Wilmerding, Pa., the home of the Westinghouse Air Brake Company; to Lorain, Ohio, where the National Tube Company is located, and to other points where the manufacturers have invested in Young Men's Christian Association buildings — why? In order at Gary to make better steel; at Wilmerding to make better air brakes; at Lorain to make better pipes; and in the coal mining regions to produce more coal. At Greenville Junction, Maine, there is a $40,000 building to take care of the loggers; down on the gulf coast in Louisiana, near one of the largest lumber mills in the world there is a $40,000 Young Men's Christian Association building put there that efficiency might be increased. I might also tell you of the construction camps, the metal mines and the southern textile fields where this agency is at work all of them illustrating the fact that the Young Men's Christian Association has a relation to industry.

We hope it will have an increasing relation, because it has to do with putting at the bottom something upon which that much-talked-of "efficiency" can stand.

You know that there is no permanent efficiency in any department of life that is not predicated upon character; and because we are in the business of developing character we feel that we are closely related to efficiency; and because efficiency is the need of modern industry we are coming closer and closer to you every day. Efficiency is a two-fold thing. It has to do with the saving of waste and with the developing of the creative. A certain governor who was going to a convention at Washing-

ton to discuss the question of conservation tells of an experience that he had. As he rode in the Pullman train, in the dining car waiting for his dinner, he looked out of the window and thought over his speech and his theme; he saw the unpainted barns and the implements lying uncared for; the delapidated fences and the unused land; his mind was engrossed and he had not noticed that a lady of ample proportions had come in and taken her seat opposite him; just as he withdrew his eyes from the scene he ejaculated, "My, what a wa(i)ste!" and the lady said, "Sir, I would have you attend to your own affairs." [Laughter.]

We know that the waste that is going on in industry is the concern of every leader. This is true of material and machinery and it is especially true of the human factor. The Young Men's Christian Association has to do not only with the waste from wilful dissipation, but also with that which comes from a failure to develop the potential skill and energy in men. The greatest waste today is not the failure to get the best out of your material and machinery. The greatest waste is the unused power of the industrial worker.

In a paper read to-night, Mr. President, we have heard reference to one of the things that has occasioned some, if not the most of the strikes in some industries—what is it? Not the wickedness of the heart of man, not the cold-bloodedness or the indifference of the employer, but the fact that there was not a medium of communication with a great body of industrial workers; the non-English speaking worker not being able to understand our language occasions an enormous loss of efficiency. We are engaged in trying to develop the maximum of efficiency, both by conserving that which is sometimes dissipated and by developing the potential which is in every industrial worker.

In this last year the Young Men's Christian Association has had contact with 150,000 of these non-English speaking men. We have an effective system of teaching English to foreigners. We had 16,000 in our classes last year, and a thousand Ameri-

cans were engaged in teaching them, giving at the same time something else that is worth quite as much as English — a personal contact with the human heart of the real American. This brings to the understanding of the foreigners something which he does not get from the padrone or from the ward politician or from the saloon keeper, from which sources he usually gets his first impression of American life.

May I call your attention to the fact that the Association which I am privileged to represent desires to do in New England and the Middle States and other territory which you represent what we are doing in other industries, as for example in connection with the Yellow Pine Manufacturers' Association. We are placing at the disposal of that industry the entire time of one of our experts to help discover some of these human needs and practical methods for meeting them. We do not intrude nor undertake to "run" the business, but we do offer a service which has a practical value. You are working for efficiency, because you know with the increasing complexity of industries you have got to have more efficient workers. We are working for character which is the basis of efficiency. May we not work together?

I have gone into your mills and seen your wonderful almost human machines. I know some of the wonders of your mechanical inventions and I am constrained to say that if you had in the last ten years put into industry the same genius in the study and development of the humanics that you have put into mechanics, you would have more to be hopeful about, shall I say? No, because we are all hopeful—you would today have more to be gratified about. The good thing that I see upon the horizon is what is illustrated here tonight, bringing to the surface the human factor in industry. Bringing to bear upon that problem something of that genius which has made America great in the manufacturing world. We must not boast, either of the Young Men's Christian Association or of America, for boasting is always dangerous. You have heard the story many times—it is a classic—but I will venture to repeat it, about the

man who was boasting of Atlanta. The business, the buildings, the streets, the bank balance, the insurance companies, the people, all were splendid, all were great; but he was obliged to admit that Atlanta was an inland city and said, "If we just had water we would be as great as New York City." And the quiet man in the smoker looked at him—you know there always is a quiet man in the group—and said, "Do I understand that all you need in Atlanta to be as great as New York is water?" "Yes," said the Atlanta man. "Then I suggest that you will lay a ten-inch pipe to the Gulf of Mexico and if you can suck as well as you can blow, you will get all the water you need." [Laughter.]

I would not have you understand that we are unduly boasting concerning the work of the Young Men's Christian Association. One of the hard things we have to do is to go before a conservative, practical New England business man and get him to believe that the Young Men's Christian Association can by any possible stretch of the imagination have a relation to his business. But I want to tell you, gentlemen, we can do it. We can render a service especially in relation to the non-English speaking employees in the New England mills, and we offer our service for that purpose.

We succeed in industry because we are co-operative, non-paternal. We represent both the employer and employee.

We do not ask title to any property; we do not take anything out of the town; we offer leadership, and we offer a platform upon which the employer and employee can come together in practical welfare work.

We consider the physical and intellectual needs of the operatives; and we consider their religious needs, because we discovered long ago that the bed-rock in a man's life is the religious and we must get down to that bed-rock for efficiency in industry or anything else.

We promote textile clubs, motion pictures, playgrounds, Sunday schools, sanitation, health talks, and even kindergartens;

and trained nurses are not strangers to us. In all this the operatives themselves bear responsibility and part of the work.

We can do this increasingly in your industry if we can get the thought into the minds of you gentlemen who are leaders that here is a force as yet comparatively unused which during the years to come ought to be harnessed to the wheels of industry. You are giving money to put up splendid Young Men's Christian Association buildings in some of your cities. Why should you not get the maximum of return out of your investment by calling upon these Associations to give some special service to your employees. They will be glad to render back such a service to you who have helped to make the Young Men's Christian Association possible in those cities. And you who are in smaller communities can be assured of a response to your invitation to investigate and report plans and cost of establishing this industrial association work in your villages and towns.

I would like to call upon this national organization to help us in the same way that those gentlemen who represent the Gulf Coast lumber industry and others have done. When we had the privilege of meeting with that group they appointed a committee of seven of the leading men of the Yellow Pine Manufacturers' Association, with whom the Young Men's Christian Association in its industrial department might confer, one of the results is that we are discovering opportunities today for service to the industry that we would not otherwise have discovered. If in this territory and in this great industry a responsive chord might be struck, if this suggestion might lead in the future to the privilege of co-operating with your organization in the interest of the industry and for the betterment of the lives of men, I shall feel that these few minutes have indeed been precious. [Applause.]

The PRESIDENT. We have before us at this time a subject which I think will appeal to every one in this room. The subject of workmen's compensation is something which we have

been considering for many years but has now become a reality in many of the states in this country, and we in Massachusetts are just beginning to study these problems from the actual operation. I know of no man who can better present this subject than Mr. HODGES. I have known Mr. HODGES personally for a number of years and have watched him in the work which he has done in this connection, and I deem it a great privilege that we have been able to secure his presence this evening to present from his long experience in general matters pertaining to this problem some suggestions and some facts regarding the workmen's compensation laws in the United States. It gives me a great deal of pleasure to introduce at this time Mr. CHARLES E. HODGES, Treasurer of the American Mutual Liability Insurance Company of Boston.

WORKMEN'S COMPENSATION LAWS IN THE UNITED STATES.

CHARLES E. HODGES, Treasurer, American Mutual Liability Insurance Co., 50 State Street, Boston, Mass.

Workmen's compensation laws, so-called, have now been passed in thirteen states in the Union and others will undoubtedly adopt similar laws in rapid succession. The change, though unwelcome on account of the present increase in the cost of accidents to injured workmen, is a relief from the almost intolerable state of affairs to which the former system had reduced us.

The waste consequent upon prolonged litigation and the intervention of lawyers in effecting compromise of claims was excessive, but the greatest evil of the former regime was the temptation to commit fraud and perjury which the desperate state of the injured operative often rendered him unable to withstand. If a plaintiff won his suit on a certain theory of negligence on the part of his employer, the next employee injured on a similar machine appeared in court with a corresponding theory, the facts suspiciously resembling those presented by the plaintiff's witnesses in the preceding case. This was repeated so often that the Liability Insurance Company or attorney for the employer generally knew in advance what the employee's claim would be when he was injured on certain machines. For example: an experienced picker tender who lost his arm by attempting to clean out a picker while the beater was in motion would go to his lawyer, who would explain to him that his employer could not be held liable on

these facts. The employee would thereupon ask how it was that another picker tender, injured in the same way, recovered a large verdict for the loss of an arm. The attorney would explain that the other man was cleaning when the beater was stopped and that the machine suddenly started up on account of some defects in the belts or pulleys. The client would thereupon exclaim, "But his accident did *not* happen that way; his machine was also running at the time, just as mine was." The attorney would reply, "Oh, well he testified that it happened so and on his testimony the question was given to the jury to decide and they believed the plaintiff's story and gave him a verdict." The client would then perhaps depart and later on employ another attorney, to whom he states his case precisely as the successful plaintiff did, and *now* he has a good cause of action. The case is tried; he testifies falsely and recovers a verdict which the attorney and client proceed to divide in the proportion previously agreed upon. If the client is dissatisfied with his share, he hesitates to complain about it lest an investigation should reveal his own crime.

Under the new system of workmen's compensation there will remain ample opportunity for deception, but I believe the temptation is greatly reduced.

You are doubtless familiar with the history of workmen's compensation laws and know that Germany took the lead in this movement, enacting a compensation law in 1884. In Germany the benefits to injured workmen are paid through the medium of mutual insurance companies made up of the various classes of industry, and supported by subscriptions from the state, the employer and the employee.

The first compensation act was passed by the British Parliament in 1897. That act does not comprehend any plan of insurance. An employer may insure the liability to pay compensation to his employees or he may pay it direct; it is almost a universal custom to insure. Other European countries have adopted workmen's compensation laws, but that of Great Britain has been used as a model in this country perhaps more than any other.

For many years attempts have been made to pass workmen's compensation laws in the Commonwealth of Massachusetts, where I believe the earliest attempts were made, but not until 1911 was any such law passed in this country. In that year the following states adopted compensation laws: California, Illinois, Kansas, Massachusetts, Nevada, New Hampshire, New Jersey, Ohio, Washington and Wisconsin. These did not all go into effect in that year. In 1912, Michigan and Rhode Island passed similar laws. A compensation law was passed in New York and became effective on September 1, 1910, which has since been declared unconstitutional. Compensation laws first became operative in the eastern states in New Jersey. This was on July 4, 1911, so that we have had in that state one full year's experience in the working of the law.

In all of these states, excepting Washington and Nevada, the compensation plan is optional with the employer. There is a penalty for not adopting the plan, differing in the various states, but generally it deprives the employer of his principal common law defences. In the State of Washington the compensation law is compulsory, and comprehends state insurance as well. Ohio and Michigan also have provisions for a form of state insurance; in the former the compensation can be paid only through the State Insurance Company.

In Massachusetts there is an insurance feature included in the law which practically provides that no employer may pay the compensation to which his injured employee is entitled except through some insurance company, either the mutual company created by the act itself or any other liability insurance company legally admitted to do business in the state. The principal reason for this is that some employers might not meet their obligations to pay compensation to injured operatives by reason of financial inability to do so, but all insurance companies authorized to do business in the state are under the supervision of the Insurance Commissioner, and if their affairs are in such condition as to endanger the insured, the Commissioner will immediately forbid their making any further con-

tracts of insurance; therefore, the insurance feature is a reasonable and desirable one. But this difficulty is met by the New Hampshire law in a different way, and probably as effectually. In that state the Commissioner of Labor may require of any employer a bond, insuring the fulfillment of his obligation to pay the compensation and such a bond may be obtained from bonding insurance companies. This plan leaves the employer who is in a strong financial condition free to pay the compensation direct to his employees, which in many instances, as in the case of large organizations like railroads, is a distinct advantage to the employer. The railroad corporation is usually so organized that it may easily maintain an insurance department of its own.

Nearly all of the compensation laws provide that the injured employee is not entitled to receive compensation during the first few days following the accident. The period varies from one to two weeks in different states, the object being to discourage what is termed "malingering." There have been various amusing incidents resulting from this provision. Not long ago a man was slightly injured in one of the cotton mills of Massachusetts. He stayed out for fourteen days and on his return explained to the overseer that he could have returned earlier but he understood that he would not be entitled to compensation unless he stayed out two weeks, — he received no compensation.

I will not undertake to make a detailed comparison of all the laws, but will mention only a few of them, leaving the others to a tabulation which will be made a part of this paper.

In New Jersey an employee may receive compensation for temporary disability where there is no specific injury at the rate of half his average weekly wages during the period of disablement, subject to a maximum of $10.00 and a minimum of $5.00 per week (unless he earns less than $5.00, when he receives full wages). Or he may receive compensation for a definite period — subject to the same weekly limits — for certain specified injuries, such as the amputation of a hand or foot; but he

is not entitled to compensation under both of these provisions.

In all the laws provision is made for surviving dependents in fatal cases.

The payments under the New Jersey law are somewhat less than under the laws of Massachusetts. Under the Massachusetts law an employee is entitled to compensation under three sections: half wages during the period of total disability; in addition to this, half wages for a fixed period, varying in amount according to injuries specified in the act; also he is entitled to receive after he returns to work one-half the difference between what he was able to earn before the accident happened and his weekly earnings afterwards.

The provision for medical attendance varies from two weeks in Massachusetts to eight weeks in Illinois, and ninety days in California.

In New Jersey the method of procedure is very simple. In case of a dispute between the employee and the employer in regard to a claim for compensation the question may be submitted to a Judge of the Court of Common Pleas of the county that would have jurisdiction in a civil case. He may determine such disputes in a summary manner and his decision on all questions of fact is conclusive and binding.

In Massachusetts the law creates an Industrial Accident Board consisting of five members who are appointed by the Governor, who have power to form committees on arbitration to hear and decide similar disputes. No compensation agreement with the employee is binding unless approved by the Industrial Accident Board, whereas in New Jersey, an employee and employer may ultimately agree upon the amount of compensation and when the employee accepts the compensation thus agreed upon the agreement is practically binding.

In Massachusetts it is impossible in any case to commute to one lump-sum payment the compensation unless the weekly payments have been made for a period of six months, at which time the Industrial Accident Board may in unusual cases allow a lump-sum settlement. In New Jersey such a settlement may

be made at almost any time by the Judge of the Court of Common Pleas upon the application of either party, provided he finds the plan of compensation to be in the interests of justice. This provision of the Massachusetts law occasions great hardship in many instances. The insurance company with which I am connected recently agreed upon a compensation settlement with the widow of a man who was killed in an industrial accident. She was a foreigner, having no relatives and almost no friends in this country, practically alone here, with one small child. She was anxious to return to her native country. The matter was laid before the Industrial Accident Board and the woman's case was strongly urged by her employer, through the insurance company, all parties concerned being anxious to pay the widow a lump sum in order that she might return to her family and friends, but the Board was obliged to rule that such a settlement could not be made and the insurance company must continue the weekly payments for six months before a commutation might be made. But there is another side to it. An ignorant employee who suddenly receives a considerable sum of money at one time is liable to be the victim of interpreters and unprincipled friends, who find easy means of separating the injured employee from his recently acquired wealth. Where the payments are made at intervals in small amounts there is less danger to the employee from this source.

For those of our members who are residents of Massachusetts I desire to say that our Industrial Accident Board has shown a disposition to fairness and justice which reflects the highest credit upon its members. It is with feelings of the greatest relief, when a dispute arises between the insurance company and employee, that we reflect that the matter may be laid before an impartial board whose decision we feel confident will be just and right, even though it may not in every case coincide exactly with the insurance company's view of justice. The success or failure of the law depends upon the action of this Board — if its decisions are weakened by excess of social sympathy, we shall soon be in the dilemma in which Germany finds herself.

Many interesting questions will arise out of the compensation laws and it will take a long time to decide all of them. The laws generally provide that compensation is due to employees suffering injury or death by accident "*arising out of and in the course of his employment*," without any reference of course to the question of the employee's negligence except such as amounts to wilful or serious misconduct. For instance, it has been held that a commercial traveler may be regarded as acting in the course of his employment so long as he is traveling on his employer's business including the whole period of time between his starting from and returning to his place of business or home.

An accident occuring while making an attempt to save the life of a fellow-workman was held to arise out of and in the course of the employment.

An injury to an engine driver who was hit by a stone thrown by a boy from an overhead bridge was held to be an accident arising out of his employment.

A workman engaged as a laborer on the public roads was required to go for his pay to the tramway depot situated in a public road some distance away. The workman was paid for the time occupied in going to and from the pay place. When returning to his work, after receiving his wages, he mounted a tram car but, finding that it did not travel to the place where his work was, started to get off and was struck by a passing car and injured. It was held to be an injury arising out of and in the course of the man's employment.

A workman will be held to be acting in the course of his employment when, having ceased actual work, he returns to the premises to obtain his pay, even though on such ceasing of such actual work the relation of master and servant is terminated. A mill-hand whose employment had ended attended at the employer's mill to receive her wages a few days later in accordance with the arrangements of trade. She met with an accident while leaving. It was held that the accident arose out of and in the course of employment. These are all English decisions. It is too early yet to cite the decisions of our own courts.

In most of our laws an employee guilty of serious and wilful misconduct, or where the injury is intentional, or self-inflicted (the language varies), the employee is not entitled to compensation. The term "serious and wilful" has been the subject of much dispute in England. Where a workman knowingly breaks a rule made by the employer in the interests of the safety of the workmen and for their own protection and that of the public, such an act on his part is evidence of serious and wilful misconduct, within the meaning of the act. This was practically the decision of the House of Lords. The facts were briefly as follows: An engine driver climbed back on the tender of his engine for the purpose of getting a certain quality of coal which he knew to be there, thus acting in direct violation of the company's rules forbidding the driver or fireman to leave the running board while the engine was in motion. The engine driver was killed. The result of the decision was not that engine drivers paid better attention to the rules of their employers, but the law was so amended as to make an exception in case injury results in death or serious permanent disablement, so that if an employee in England is killed in the course of his employment compensation must be paid, although his death was the result of his serious and wilful misconduct.

It is a fair statement, I think, that the great majority of employers in the states where a compensation law has been passed, have taken advantage of its provisions. Perhaps an exception may be made in the case of Ohio, where an employer is offered the alternative of insuring the compensation of his employees in a state company or having his defences taken away. Where the insurance plan is adopted the employee is required to contribute 10 per cent. of the premium cost. Owing partly to the fact that the employer resents this system of compulsion and partly because the insurance companies object to having the business taken out of their hands, and consequently are making very low rates for insurance outside of the compensation plan, the Ohio employer generally prefers to take his chances with a jury, even though the three principal defences are removed.

New Hampshire also furnishes an example of the disadvantages in cost to the employer of the compensation plan. In that state the employee has the right to elect after he is injured whether he will accept the compensation provided by the law or retain his common law right of action. Under this system if an employee were injured through the negligence of his employer, then the employee would probably elect to bring suit in the old way, and would reasonably expect damages in excess of the amount which he would receive under the compensation plan. If the circumstances attending the accident should indicate no common law liability on the part of the employer, then the employee would accept the compensation. It is evident that this scheme makes the cost of accident under the compensation plan greater than under the negligence laws, with the two defences taken away of the negligence of a fellow-servant and of the assumption of the risk. For in New Hampshire the defence of contributory negligence on the part of the injured employee is still open to the employer, although the burden of proof is on the employer to show that the employee was negligent. I have heard of but few prominent employers in the state of New Hampshire who have adopted the compensation plan.

In Massachusetts the manufacturing employer who does not insure the compensation of his employees is a rare exception, There are cases where an employer, perhaps resenting the obligation to pay the compensation through an insurance company, has decided to insure himself against claims based upon the negligence section of the law.

In regard to the cost of accidents to employees under the new laws, I believe the employer may reasonably hope that ultimately it will not be as great as the current rates of insurance against the compensation make it appear. I think the insurance companies have acted wisely, in fact could hardly have adopted any other course, in making the rates as high as they have done. The system is an untried one in this country and no one can foresee with certainty what the ratio will be between the cost of accidents and the wages paid to employees, which is the basis used in determining the premium for insurance.

The insurance companies have tried to differentiate in making rates in the several states according to the degree of liability to loss due to the variation in the laws. No rate combination among insurance companies is likely to be strong enough to withstand the competition of companies which are always to be found outside of such combinations, and therefore, if the rates for a while are higher than they should be they must be reduced, and I believe there is no disposition on the part of most companies to maintain extortionate rates, although of course the stock liability companies are not in this business for their health.

The tremendous agitation of this whole subject will in itself tend to diminish the cost of industrial accidents because the number of such accidents must inevitably decrease. The manufacturer is more alive than ever before to the necessity of providing every reasonable means of safeguarding his works, ways, and machinery. The inspections made by insurance companies will be more rigid than ever before, laws will be passed compelling safeguards, and I have even heard some employers, inspired by this movement, assert that they will henceforth insist upon a more careful selection of employees engaged to work upon dangerous machinery. Offsetting this to some extent, the compensation laws will be modified from time to time, probably tending towards higher compensation and greater benefits to the employees. Ultimately, perhaps, there will be such uniformity in the workmen's compensation laws of the various states that the added tax upon the employer will not cause embarrassment, especially in so far as competition among domestic manufacturers is concerned.

The success of this whole scheme depends largely upon the fairness and magnanimity of employers and insurance companies on the one hand, and employees on the other, combined with unbiased decisions by the boards of arbitration.

I feel very sure that the disposition of employers and insurance companies alike is to deal fairly and liberally in the adjustment of compensation claims. In justice to liability insurance companies it should be said that the contracts which they issued

in the past were specifically limited to indemnifying the employer for loss which was the result of claims founded upon the employer's negligence, and they did not pretend to provide compensation for injured workmen. Many employers, as well as employees, never wholly understood this and believed that the premiums were paid for a sort of accident insurance for the benefit of the employee; to this misunderstanding is due to a great extent the popular impression that insurance companies have dealt unfairly with employers and their employees in the adjustment of claims. Now, this is all changed. The insurance companies have charged what is believed to be an adequate premium for insurance which is more or less clearly defined by the laws which govern the contract, and I believe it will be found that the insurance company is quite as anxious to pay the compensation which the law prescribes as the employer would be if he carried his own insurance.

For many years we have been confronted by these two propositions: No one should be obliged to pay for the injury to another unless it was caused by his fault. This is reason; but, on the other hand, a workman earning small wages, disabled by accidental injury arising out of his employment, should have pecuniary aid, even though his employer was not at fault, and his own carelessness may have, to some extent, contributed to his injury. This also is reason. These propositions are diametrically opposed to each other, and to reconcile them the workman's compensation acts are the earnest attempts of legislatures. How well they have succeeded we cannot now judge, but we all feel that the effort is in the right direction. I think the time has come when we must consider the human being even more than we have in the past, and less than we have in the past the dollar which he earns for us.

COMPARISON OF WORKMEN'S COMPENSATION LAWS IN THE UNITED STATES, SEPTEMBER 9, 1912.

	CALIFORNIA.	ILLINOIS.	KANSAS.	MASSACHUSETTS.
Law passed Became effective	April 8, 1911. September 1, 1911.	June 10, 1911. May 1, 1912.	March 14, 1911. January 1, 1912.	July 28, 1911. July 1, 1912.
Defences abrogated	Assumption of risk; Negligence of fellow-servant; Contributory negligence superseded by doctrine of comparative negligence.	Assumption of risk; Negligence of fellow-servant; Contributory negligence, but contributory negligence may be considered by jury in reducing damages.	Assumption of risk; Negligence of fellow-servant; Contributory negligence considered by jury in assessing damages.	Assumption of risk; Negligence of fellow-servant; Contributory negligence.
Compensation How paid?	By employer direct or through insurance company.	By employer or through insurance company.	By employer direct or through insurance company.	Through insurance companies only, authorized to do business in Massachusetts.
Administration	Industrial Accident Board.	Local Arbitration Board, subject to appeal and right of trial by jury.	Arbitration, subject to review by court.	Industrial Accident Board.
Employers included	All who elect to accept compensation plan.	All who elect to accept compensation plan, engaged in specified trades or industries, broadly including all manufacturing.	All who employ fifteen or more workmen, and who elect.	All who elect.
Employees included	All except casual not in usual course of the trade.	All except casual and not in usual course of the trade.	All engaged regularly in the employer's business.	All except casual or not employed in usual course of trade and domestic servants and farm laborers.
Employments included	All.	Specified employments termed dangerous includes manufacturing.	Those specified as dangerous, includes manufacturing.	All except domestic servants and farm laborers.
Injuries covered	All arising out of employment unless caused by wilful misconduct of employee.	All arising out of employment unless resulting from deliberate intention of employee.	All except those caused by deliberate intention, including wilful failure to use safety devices.	All unless due to serious and wilful misconduct.
Death payments	Three years' earnings, minimum $1,000, maximum $5,000, no dependents $100. Lump sum or weekly payments as ordered by Board.	Four years' earnings; minimum $1,500, maximum $3,500, no dependents $150.	Three years' earnings; minimum $1,200, maximum $3,600, no dependents $100.	50 per cent. weekly wages 300 weeks; minimum $4, maximum $10, no dependents $200.

COMPARISON OF WORKMEN'S COMPENSATION LAWS IN THE UNITED STATES, SEPTEMBER 9, 1912.—CONTINUED.

	CALIFORNIA.	ILLINOIS.	KANSAS.	MASSACHUSETTS.
Waiting period	One week.	One week.	Two weeks.	Two weeks.
Disability payments	65 per cent. weekly wages (100 per cent. if nurse required); minimum $4.16, maximum $20.83. Aggregate indemnity shall not exceed three times average annual earnings of employee. Aggregate disability period maximum fifteen years.	50 per cent. weekly earnings, eight years; minimum $5, maximum $12, limit $3,500. If complete disability continues after payments reach amount of death benefit or after eight years, then compensation during life not less than $10 a month.*	50 per cent. weekly earnings; minimum six, maximum fifteen, not exceeding ten years; partial disability 25 per cent. to 50 per cent., minimum $3, maximum $12.	50 per cent. weekly wages; minimum $4, maximum $10, not exceeding 500 weeks for $3,000. In addition in case of certain specified permanent injuries compensation at above rate for specific periods, varying from twelve to one hundred weeks; also in addition one-half difference earning capacity before and after accident.
Medical aid	Surgical treatment, medicines, supplies, crutches, etc., during ninety days, limit $100.	Medical and hospital eight weeks, $200 limit.	None. In case of death, no dependents, medical attendance and burial, limit $100.	During first two weeks reasonable medical and hospital services and medicines when needed.
Settlements for lump sum	Allowed to compromise by agreement of parties.	After compensation payments for six months, allowed in cases of complete disability. No settlement allowed within seven days.	By agreement after six months liability may be redeemed by payment of 80 per cent. of amount then remaining due.	Allowed in unusual cases after weekly payments have continued six months.
Election of remedies	Employee may elect after injury if injury caused by personal gross negligence of employer or violation of statute relating to safety of employees.	Employee may elect after accident if injury result of employer's failure to comply with statutes relating to safety.	Allowed where injury approximately caused by individual negligence of employer, including directors, managing officer, managing agent or partner.	By notice before accident.

* From serious and permanent disfigurement of hands or face, not actually incapacitating, reasonable compensation (determined by arbitration) not to exceed one-fourth of death benefit.

COMPARISON OF WORKMEN'S COMPENSATION LAWS IN THE UNITED STATES, SEPTEMBER 9, 1912.—CONTINUED.

	MICHIGAN.	NEVADA.	NEW HAMPSHIRE.	NEW JERSEY.
Law passed Became effective	March 20, 1912. September 1, 1912.	March 24, 1911. July 1, 1911.	April 15, 1911. January 1, 1912.	April 4, 1911. July 4, 1911.
Defences abrogated	Assumption of risk; Negligence of fellow-servant; Contributory negligence.	Assumption of risk; Negligence of fellow-servant; Comparative negligence substituted for Contributory negligence.	Assumption of risk; Negligence of fellow-servant; Burden of proof contributory negligence shifted to defendant.	Assumption of risk; Negligence fellow-servant; Contributory negligence.
Compensation How paid?	Direct or through optional insurance on proof of solvency or through Insurance Commissioner.	By employer direct or through an insurance company.	By employer direct or through an insurance company.	By employer or through an insurance company.
Administration,	Industrial Accident Board.	By arbitration proceedings.	Superior Court or any Justice thereof.	Judge of the Court of Common Pleas.
Employers included	All who elect.	Compulsory on all employers in specified employments.	All in specific employments having accepted provisions of the Act and filed a bond if required.	All who have elected to accept provisions of the Act.
Employees included	All excepting domestic servants and farm laborers and casual employees or those not in usual course of trade.	All in specified employments.	All engaged in manual or mechanical labor.	All except casual.
Employments included	All excepting domestic service and farming.	All deemed to be hazardous; not extended to manufacturing.	Specified employments, practically extending to manufacturing.	All except casual employments.
Injuries covered	All unless result of intentional and wilful misconduct.	All.	All arising out of and in course of employment, unless caused by wilful misconduct.	All arising out of and in course of employment except intentionally self-inflicted or due to intoxication.
Death payments	50 per cent. weekly wages 300 weeks; minimum $4, maximum $10, no dependents $200.	Three years' earnings or $2,000, whichever is greater, not exceeding $3,000; no dependents, medical and burial, limit $300.	Wholly dependent, 150 times weekly wages, limit $3,000; partially dependent, in proportion to dependence; no dependents medical aid and burial, limit $100.	25 per cent. to 60 per cent. wages; minimum $5, maximum $10 (if wages less than $5, in full) limit 300 weeks. No dependents $200.
iiting period	Two weeks, provided if disability continues for eight weeks or longer compensation computed from date of injury.	Ten days.	Two weeks.	Two weeks.

COMPARISON OF WORKMEN'S COMPENSATION LAWS IN THE UNITED STATES, SEPTEMBER 9, 1912.—CONTINUED.

	MICHIGAN.	NEVADA.	NEW HAMPSHIRE.	NEW JERSEY.
Disability payments	Half weekly wages, minimum $4, maximum $10, not exceeding 500 weeks or $4,000. Compensation on same basis for fixed periods in specified injuries. In addition one-half difference earning capac-.ty before and after injury, not longer than 300 weeks.	60 per cent. weekly earnings, limit, $3,000. In addition specified injuries 40 per cent. weekly earnings; other specified injuries 15 per cent. weekly earnings. All payments not to exceed total wages, or $3,000.	50 per cent. earnings, maximum $10 a week for 300 weeks, or $3,000; also one-half difference earnings before and after accident.	*Temporary*, 50 per cent. wages; minimum $5, maximum $10 (if wages less than $5, in full); limit 300 weeks. *Total and permanent*, same payments, limit 400 weeks. *Partial but permanent*, by a schedule of injuries for fixed periods.
Medical aid	Reasonable medical and hospital during first three weeks, when needed.	None, except as provided for death with no dependents.	None, except as provided for death with no dependents.	Reasonable medical and hospital during two weeks, limit $100.
Settlements for lump sum	After payments have continued six months, by agreement of parties, approved by Industrial Accident Board. Or at any time if directed by the Board.	Nothing specified.	Superior Court may order a lump sum payment on application of either party.	Commutation by Judge of Court of Common Pleas on application of either party.
Election of remedies	By notice before accident.	Free to employee, but none for employer.	Employee may elect after accident.	No election before accident.

COMPARISON OF WORKMEN'S COMPENSATION LAWS IN THE UNITED STATES, SEPTEMBER 9, 1912.—CONTINUED.

	OHIO.	RHODE ISLAND.	WASHINGTON.	WISCONSIN.
Law passed Became effective	June 15, 1911. January 1, 1912.	April 29, 1912. October 1, 1912.	March 14, 1911. October 1, 1911.	May 3, 1911. September 1, 1911.
Defences abrogated	Assumption of risk; Negligence fellow-servant; Contributory negligence.	Assumption of risk; Negligence fellow-servant; Contributory negligence.	Assumption of risk; Negligence fellow-servant; Contributory negligence superseded by doctrine of comparative negligence.	Assumption of risk; Negligence fellow-servant.
Compensation How paid?	Through State insurance; premiums paid by employer 90 per cent., by employees 10 per cent.	Employer direct or through an insurance company.	By employer through State insurance.	By employer or through an insurance company.
Administration	Board of Arbitration.	Justice of Superior Court, subject to appeal to the Supreme Court on questions of law.	Industrial Insurance Department; three commissioners.	Industrial Commission.
Employers included	All who employ five or more operatives regularly in the same business and who elect to accept insurance provisions.	All who elect and employ six or more. Employers may by agreement with employees provide scheme of compensation, subject to approval of Superior Court.	All; compulsory for those engaged in hazardous employments.	All who elect.
Employees included	All.	All, except those engaged in domestic service or agriculture or casual employees not in employer's business or whose wages do not exceed $1,800 a year.	All.	All except casual.
Employments included	All.	All except domestic service or agriculture.	All specified as hazardous.	All.
Injuries covered	All, unless self-inflicted.	All arising out of or in course of employment, except when caused by wilful intention to injure or kill himself or others.	All except intentional; if caused by removal of safety guard by employees compensation reduced 10 per cent.	All, unless wilful misconduct of employee.

COMPARISON OF WORKMEN'S COMPENSATION LAWS IN THE UNITED STATES, SEPTEMBER 9, 1912.—CONTINUED.

	OHIO.	RHODE ISLAND.	WASHINGTON.	WISCONSIN.
Death payments	66⅔ per cent. average weekly wages for period between death and six years after date of injury; minimum $1,500, maximum $3,400; funeral expenses, limit $150.	One-half weekly wages; minimum $4, maximum $10; limit 300 weeks; partially dependent in proportion to dependence; no dependents expenses last sickness and burial; limit $200.	Burial in all cases; limit $75. If widow or invalid widower $20 per month for life to surviving spouse unless remarriage; $5 per month each child under sixteen, not to exceed in all $35 a month. Other provisions for orphans. Maximum $4,000.	Four years' earnings; minimum $1,500, maximum $3,000; no dependents, $100.
Waiting period	One week.	Two weeks.	Immediately.	One week.
Disability payments	*Temporary*, 66⅔ per cent. of earnings, minimum $5, maximum $12 (if wages less than $5, in full); limit, six years, $3,400. *Permanent and total*, same payments until death.	*Total*: one-half weekly wages, minimum $4, maximum $10; limit 500 weeks, specified cases presumed permanent total disability; in addition fixed amounts for specified injuries. *Partial*: one-half difference earnings before and after injury, maximum $10, limit 300 weeks.	*Total*: monthly payments $20 if single, $25 if married; $5 for each child under sixteen; limit per month $35, maximum $4,000. Partial disability proportionate, not exceeding $1,500.	*Total*: 65 per cent. of earnings figured on minimum $375, maximum $750, annual wage; limit four years' earnings. *Partial*: 65 per cent. of wages lost, limit four years' earnings or $3,000, fifteen years.
Medical aid	Medical, nurse, hospital and medicines; limit $200.	Reasonable medical, hospital and medicines during two weeks; amount of charge if disagreement fixed by Superior Court.	No provision.	Reasonable for first ninety days.
Settlements for lump sum	Permitted by Board of Arbitration.	Allowed after payments have continued six months, by petition to Superior Court.	Within prescribed rule by agreement between the department and the beneficiary.	Permitted with approval of Industrial Accident Board.
Election of remedies	Employee may elect in case of wilful act of employer or his failure to comply with laws respecting safety devices.	By notice before accident.	If employer fails to pay premium to State Fund, employee may elect whether to sue under old law or claim compensation from the state. Otherwise compulsory.	None after accident.

New York.—In effect September 1, 1910; first Compensation Act to be passed in this country. Declared unconstitutional in Ives vs. So. Buffalo Ry. Co.

The PRESIDENT. This is the last paper of the evening. Are there any questions that any of you would care to ask Mr. HODGES? The hour is rather late, but if there are any I am sure he would be very glad to answer them.

The evening session is now adjourned and we will meet again tomorrow morning at 10 o'clock.

FOURTH SESSION.

WEDNESDAY MORNING, SEPTEMBER 11, 1912.

The Association met at 10 A. M., President GREENE in the chair.

The PRESIDENT. The pleasant weather outside seems to interfere with the prompt gathering of members this morning, but I think we had better go ahead.

The first paper this morning is on the Economic Use of Lubricating Oils, by Mr. DAVID A. COREY, General Sales Manager of S. F. Bowser & Company, Inc., Fort Wayne, Ind. I am glad to introduce Mr. COREY.

ECONOMIC USE OF LUBRICATING OILS.

DAVID A. COREY, S. F. Bowser & Co., Inc., Fort Wayne, Indiana.

In the letter inviting me to present a paper at this meeting on the Economic Use of Oils, the following sentence occurred:

"While it is conceded that this is not adaptable as a whole to much of the cotton textile machinery, yet it is adaptable to repair shops, engine rooms and main shafting, which cost money, even if they do not make cloth or yarn directly."

It is this question of the application and adaptability of economic methods to the use, care and saving of oils in the textile manufacturing plant that I propose to discuss. It is true that the oil question cannot be measured in the familiar terms of the industry, as "picks" and "twist," "warp" and "filling," but it does, nevertheless, have a direct bearing upon the manufactured goods through its general effect upon efficiency and production, and is quite as important and should have as much thoughtful care and consideration as the selection of improved machinery. The harder and more exacting the service required, the higher the standard of manufacturing efficiency, the more the attention which should be given to the subject. This applies, not only to the selection of oils suitable for the various requirements, but quite as much to a proper method of storing, dispensing, and otherwise caring for and conserving the materials purchased.

Oil costs money; it is an important factor in the successful operation of machinery. The lack of oil or failure to properly care for that in use is a serious matter and is, perhaps, more than any other one thing the cause of failure to secure maximum effi-

ciency in machine operation; and that loss costs more money. This applies with equal force to the power house, to the machine shop, to transmission machinery and to the producing machinery. Improved service means more profit, and so from one viewpoint or another, everyone, from engineer and operator, to official and stockholder, is interested in this general subject of efficiency.

The selection of oils for the many requirements of a manufacturing plant is a matter which is worthy of, and is now receiving, much more study than was the case a few years ago; and the purpose of many expert and practical tests is to determine what lubricants are best for high, medium, and low speeds, for light and heavy journal bearings, etc., and it is generally conceded that such tests are the only true means of definitely determining what oils render the best service under different conditions. Reliable oil manufacturers are prepared to submit the results of such tests and, for fixed and definite service, to guarantee results.

In railroad service it is now almost universal practice to contract for the entire oil supply on the basis of a specified quantity per car mile; and that quantity is allowed for the operation of each car for each mile or thousand miles traveled. In the same way, predetermined quantities of lubricating and cylinder oils are issued to the engineers for their fixed "runs," all based upon a certain quantity per thousand miles. Of course, to make this possible, the operating equipment must be taken care of and kept up to the highest point of efficiency, but that alone is a strong factor in favor of the plan. It is quite possible, and I think we may safely say probable, that a similar plan will some day be evolved for issuing oils and supplies in manufacturing establishments having a standard output on the basis of production, and that the plan will be instrumental in effecting greater efficiency and so decreasing production costs.

To make the saving and low costs of oils effective to the highest degree, it is necessary, after the selection of oils has been made, to provide suitable means for properly storing and

issuing them. The common plan of keeping oil in barrels is especially wasteful. It has been well said that barrels are for transportation, not for storage purposes. The loss by seepage, evaporation, absorption, non-drainage of barrels, and from faucets would be appalling if realized by the men who pay the bills. Practical tests in manufacturing plants by engineers who are constantly studying this subject show actual losses in lubricating oils of from 5 to 25 per cent., or 2 to 12 gallons per barrel of an average capacity of 50 gallons. In paint oils, such as linseed, turpentine, varnishes, etc., the losses approximate the same, but in gasoline or naphtha and other volatile oils, the loss is much greater. Barrels in storage which had not been opened have been found to be entirely empty.

Among many others, five cases have been observed within the past few months which are of especial interest because of their size and the impression created by the figures shown. In each of these plants the methods of purchase, storage and handling are those usually employed; the oils, except naphtha which came in tank cars, being received in barrels, and stored in them, and drawn through faucets as required. Careful study by an efficiency engineer, co-operating with representatives of the concerns interested, showed results as follows:

Number of Oils and Liquids Handled,	15	12	69	32	50
Total Number Gallons Used per Year,	55,150	79,000	618,696	1,715,520	353,900
Loss by Leakage, Evaporation and Non-Drainage, plus estimated saving by improved method of handling and purchase,	$2,574	$3,340	$12,000	$45,634	$56,410

The large relative differences shown are in a measure due to the differences in values of materials handled, but these estimates are safe and conservative, having been made up after an intimate examination of the conditions prevailing in the five plants, and the figures used were taken from their books. In every case the analysis and statement were endorsed by representatives of the interested parties.

An important phase in oil and manufacturing economy, when the character of machinery renders possible the necessary equipment, is the re-use of oil. To re-use oil it must necessarily have all impurities that will cause damage removed, else the re-use will result in actual loss. In many plants the oil used is caught and again used on rough work, where the impurities will do no appreciable damage.

It may seem that in such cases the loss has been well guarded against, and that any further saving would be too small to justify an investment or the spending of much time in its consideration; but lubrication economy means vastly more than the first cost, for the lubricant supplied may be entirely used up in service with virtually no waste or "drips," but this is not economical lubrication. Practice has demonstrated that there is always another item of expense besides the oil cost, and that is the cost of repairs or renewals due to injury arising from too scant lubrication, and this practice has coined the expression "sufficient lubrication."

This is a wholly inadequate and misleading term, for as commonly used it means only enough lubrication to prevent injury to the journal. It in no way measures the economy of lubrication but rather defines the limit of loss that is endurable without destroying the journal.

In modern practice the so-called "sufficient" lubrication is no longer considered adequate; flooded journals are demanded and the highest economy requires the re-use of oil. No half way provision is tenable, and if oil is to be re-used, there is no object whatever in restricting its use. The expression "the more oil you use, the less you lose" is wholly correct, for oil losses are due to destructive distillation at the journal. A greater quantity of oil produces less friction, therefore less heat and less distillation loss. The friction losses are governed to a very large extent by the quantity fed.

To secure satisfactory service in re-using oil it must be thoroughly cleansed. Old oil is not different from new if the impurities be removed. Petroleum oils never wear out, any more

than water, but the lighter properties can be lost by distillation, which may occur at the temperature of an improperly lubricated journal, and to avoid this, it is necessary to keep journal temperatures low, or in other words, reduce friction by the use of large quantities of oil. The re-use of oil is now common in nearly every factory, by using ring-oiled bearings. Nobody looks upon this as much of a hazard, but if the dirty oil were taken out of the ring-oiled bearing and put into an oil cup on some other machine it would surely be looked upon as unwise and dangerous. As a matter of fact it would be both.

In the case of ring-oiled bearings, as the impurities increase in quantity they retard the flow of oil; and if the oil is not drawn off and bearings cleaned out it will cause serious cutting of the journals. This cutting may not be very plainly manifested, in fact the operator is more than likely to think that he has no trouble with his ring-oiled bearings. Furthermore, he may look upon the excessive wear as natural wear, while in fact it is due entirely to dirty oil, and consequent inability to keep the journal faces the necessary distance away from each other to permit the impurities to freely pass between. The highest lubricating efficiency, therefore, demands clean oil as well as the large quantity.

The losses due to faulty lubrication are far greater than are generally recognized.

In the power plant the friction (and consequent fuel) loss is a very conspicuous item. To reduce this loss much oil must be used, and the amount of oil used will determine the saving possible in fuel. The saving possible in the engine room is frequently of such magnitude that an investment equal to the yearly coal cost would be justified, but as a matter of fact, only about one-tenth this amount is necessary to get the best possible results. Figure 1 demonstrates more fully the value of stream fed lubrication.

Ordinarily, two hundred times as much oil can be fed upon the journals of an engine as would be the minimum amount possible. This chart shows the different savings when feeding

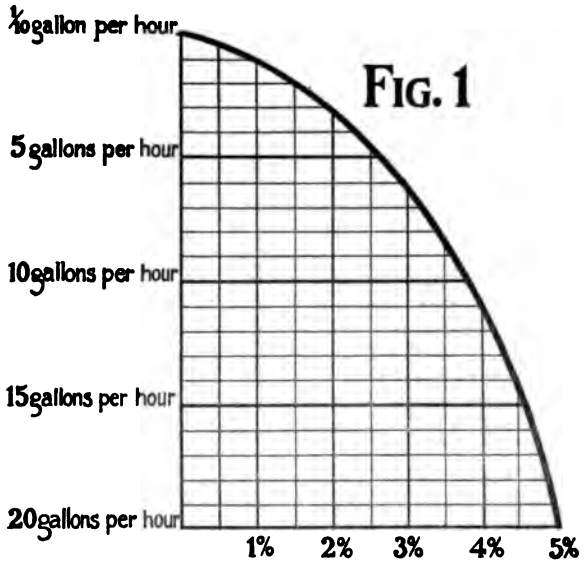

FIG. 1

FILTER SURFACE ECONOMIES.

different quantities, and when the total maximum saving is 5 per cent. For instance, if five gallons per hour be circulated, the saving would be 2½ per cent.; if twenty gallons an hour be circulated it would effect a saving of 5 per cent., an amount which is invariably possible. The amount of oil shown in chart would be that required for a 750 horse power engine. The use of stream fed, well filtered oil is always possible and very profitable in any engine room, paying ordinarily from 50 to 100 per cent. yearly return on the investment.

As in the preparation of this paper I have had, as a collaborator, WILLIAM L. MORRIS, M. E., I am at liberty to quote from an article written by him which appeared in the Engineering Magazine for April, 1912, entitled, "Oiling Systems That Pay 100 Per Cent. Dividends."

"An oiling system that will reduce friction five per cent. will effect savings in one year's time sufficient to pay the entire cost of installation, and if run twenty-four hours a day it will effect even more. To secure the ultimate savings possible, it is neces-

sary that the system be exceedingly large in all its provisions, and that it can be easily kept clean. It should be possible to clean all parts of the system while it is in service; men don't work overtime if they can avoid it, the result being that cleaning would be neglected. A 100 per cent. system cannot be obtained with less than two square feet of filtering surface for each gallon of oil filtered per hour, and the capacity should be not less than two hundred times what would be possible with a minimum hand feed. The per cent. value of a system closely approximates the amount of surface furnished and, in common with all machinery, the price does not increase as much as indicated by the quantity. If an engine room be supplied with a small system having 10 square feet of surface when it should have 100, there will be a constant yearly loss of nine-tenths the value of the larger 100 per cent. system. A sample list of savings are here tabulated, using a sample plant as an illustration:

Three 500-kilowatt engines, run 20 hours per day; average, full load, 12 hours, 300 days per year. Coal consumption, 10 pounds per kilowatt hour. Coal cost per ton, $1.80. Unloading, firing, cleaning ashes, cleaning boilers, etc., $0.40 per ton.

Coal cost per year:		
27,000 tons at $1.80,	$48,600 00	
Coal handling at $0.40 per ton,	10,800 00	
	$59,400 00	
5 per cent. frictional savings,		$2,970 00
24 barrels of 50 gallons at $0.40,	480 00	
6 barrels of 50 gallons with system at $0.15,	45 00	
Oil saving,		435 00
Repairs to journals,	$100 00	
Repairs with system, 20 per cent.,	20 00	
Saving in repairs,		80 00
Shutdowns, loss of labor, materials and profit,		75 00

Value of engines, etc., that would be lost when worn out, $100,000. Life by hand feed, 25 years, $4,000 per year depreciation; life by stream feed, 40 years or per year, $2,500.	
Yearly saving in depreciation,	$1,500 00
20 per cent. of the time of oilers utilized for useful work, $1,200 x 20 per cent.,	240 00
Savings, occasioned by removing vibration from foundations, piping, etc., disregarded,	000 00
Total savings,	$5,300 00
Cost of system to effect these economies, including necessary oil guards, cups, piping and installation,	$2,650 00

The figures as given show a 200 per cent. system, this being possible if plant runs as many hours as noted and other conditions being as shown. It is only in plants using refuse for fuel, or other exceptional conditions, that would not permit a 100 per cent. saving if provided with a 100 per cent. system."

The same care should be exercised in the installation of all new machinery which requires lubricated journals; for friction in the factory affects the coal pile just as much as does friction in the engine room.

Oiling systems and ring oiled bearings have come into use during the life of the present operators and have met with opposition from the start. The first obstacle was the general prejudice against re-using oil; and following this was the reluctance of manufacturers to make up new patterns suitable for the re-use of oil. Bearings for line shafts were first arranged for grease, then for wick or capillary oiling and now the use of ring, chain or collar oiling is quite general throughout the factory. The general tendency in the matter of oiling shafting is correct as all general tendencies are bound to be. Light oils in abundance are the friction savers and savers of machinery,

and to make this system a perfect success it is necessary to eliminate as far as possible the re-use of dirty oil. The continuous circulation of a very large quantity of clean light oil is the last word in lubrication: it assures the greatest benefits possible and at a cost not greater, and in most cases much less, than the poorest lubrication that will barely keep the journals from destruction. These facts being fully appreciated, it is then wholly a matter of application.

It may occur to the power user that since his machinery has not been equipped for stream fed lubrication, it would not pay in his case to arrange for such. It is doubtful if there are any such hopeless cases.

If the best practice is not obtainable, at least a far more efficient system may be employed than the existing scant or drop feed oiling, or the re-use of dirty oil. The physical conditions of the plant must determine just how perfect a system can be employed. The bearing shown in Figure 2 is one especially suited for stream feed and drips drained away, this permitting the highest possible grade of lubrication. The oil runs off the bearing and cannot be returned to it, until it has passed through a filter, and such impurities as would injure the journal removed. The collars on ends of journal prevent the oil creeping along the shaft. This form is as safe against shut down as any system that can be devised.

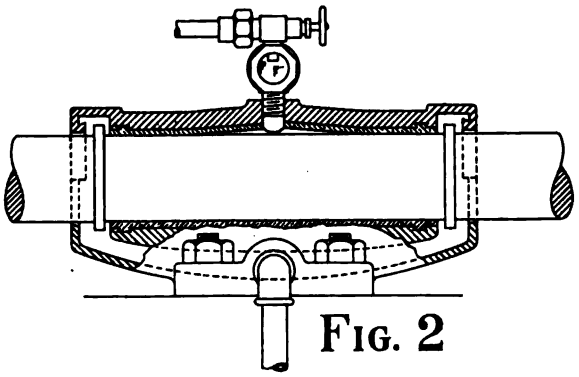

FIG. 2

STREAM FEED BEARING.

Another method of increasing the efficiency of ring, collar, or chain-oiled bearings is to occasionally wash out the bearings and supply with clean oil. This is more troublesome and not so efficient as the piped system shown in Figure 2, but it is probably the most efficient arrangement used at present for shafting, motors and the like. The great objection to this method is that so little attention is given to a journal after it has been filled with oil. Possibly once a month a little more oil is poured into the oil receptacle, and nobody ever thinks of cleaning it out. This is the use of dirty oil in its worst form. There is enough oil in the journal to keep it from melting out the Babbitt, and that is about all the good that can be said of it. It produces much friction and causes much wear of the bearings.

By observation and comparison of the power required to drive a line of shafting and the idle running machines, first with clean and then with dirty oil, and knowing the length of time this loss was endured, it can be readily determined whether it pays to change oil every month, or oftener. If the saving in power alone is equal to the labor cost it would be justified as all other savings would be clear gain. But for heavily loaded, troublesome bearings, wherever they may be, some arrangement of flooded lubrication should be provided. If it cannot be connected to a central oiling system, then provide an individual system with possibly a rotary pump run by the machine. The re-use of a large quantity of oil is imperative wherever friction is at all noticeable, and it is safe to assume that some satisfactory arrangement can be provided. Hot or troublesome bearings are positive indications of careless or indifferent regard to operation economy. The application of grease, graphite and the like may aid, but it cannot eliminate the lubrication loss. Wherever grease is essential for operation look closely for something wrong. Flooded journals will stand virtually any service to be met in ordinary factory service, and to provide flooded journals we must use the same oil over and over again; there is no alternative.

But little has been said in regard to the machines in the factory. If the bearings be small, requiring but little oil, and no provision has been made for flooded lubrication, it is safe generally to assume that the economies to be derived will not justify the expense and complications which would be met, but in securing new equipment an effort should be made to have stream fed or ring-oiled bearings. In many cases the hand oiler must continue, and it must, in fact, be conceded that in the textile mill the conditions are such as to make this method necessary, but many special devices for safely storing and handling have been designed as the basis for conserving the oils, to minimize the cost and assure ease and accuracy in handling, to preserve the quality, to keep the oil free from dust and lint and to reduce the fire hazard to the minimum.

The common method of distribution in mills is by means of tanks of 10 to 60 gallons capacity in the different departments, the sizes depending upon the judgment of the management; some preferring few large tanks while others prefer small tanks placed at more frequent intervals. The latter plan is very satisfactory as the small tanks can be removed from the mill for filling at the storage house outside, and in the mill are more conveniently located for the operatives.

When small tanks are used, several of them can be transported on a truck to the storage room and returned in the same manner after filling. A tank of this kind should preferably be equipped with a non-overflow discharge, so that the oil cups can be quickly filled without spillage and without the usual accompaniment of waste which becomes saturated with oil, is thrown away, and becomes a fire menace.

FIGURE 3.
Dust-proof Oil Tank with Non-overflow Discharge.

FIGURE 4.—PORTABLE OIL TANK.

Another method of distributing to tanks in the mill is by means of portable tanks, which are filled at the storage room, wheeled into the mill and the oil discharged into the permanent tanks by means of pumps.

These methods are decided improvements over the present common one of taking barrels on elevators to the different floors, rolling them through the mill to the stationary tanks and using transfer pumps or similar methods for transferring the oils from barrels to tanks. Leaky, and sometimes broken, barrels leave traces behind, and this custom is dirty and dangerous. Figure 5 offers a suggestion.

A third method and one which is being largely adopted for certain factory uses and does away with transportation about the plant, is by means of long distance pumps operated by hand or power, located at convenient points about the factory and drawing the oils from one central storage point. The advantages of this system are manifest, especially where large quantities of oils are used in manufacturing operations, and measurements of the quantity delivered is desired. In utilizing any of the plans suggested, to get the full value of the system the amounts issued to each department should be charged against that department, and to this the measuring features of the supply pumps are of great assistance. The neatness of the well-equipped central storage room, showing the elimination of barrels and the use of steel tanks without faucets or any openings in the tanks except in the tops, the oils being drawn by means of oil pumps, and certain oils stored in underground tanks and drawn by means of

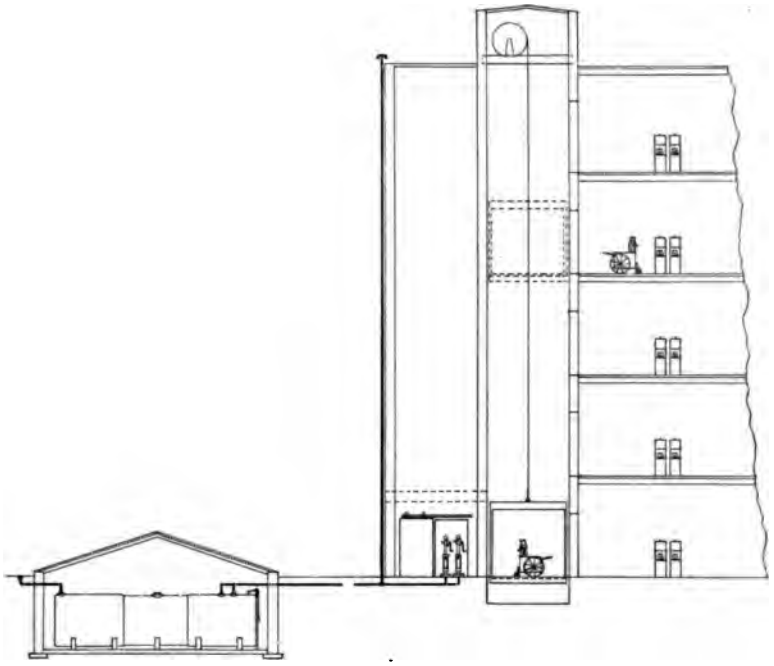

FIGURE 5.—OUTLINE OF FACTORY OIL EQUIPMENT.

FIGURE 6.—A NEW ENGLAND MILL OIL ROOM.

long distance pumps is shown in the illustration (Figure 6) of the equipment of one New England mill.

Still another method of delivering and measuring oils and other liquids is by means of an electric remote control system of pumps and measuring devices, used in manufacturing operations where considerable quantities are required in mixing, compounding, etc. The measures are automatic in delivering any desired or predetermined quantity.

The whole subject of oil handling and lubrication efficiency is now recognized as one of great importance, as is shown by the consideration and study which has brought about the development of special apparatus and the investment of capital in its manufacture to meet the needs and demands. It is a subject large enough to warrant the attention of every manufacturer and the advice of experts, for it is directly and indirectly a considerable factor in the cost of operation and production, and upon efficiency depends dividends.

The PRESIDENT. Are there any questions which you care to ask Mr. COREY? I am sure he would be very glad to have some discussion.

Mr. C. J. H. WOODBURY. Mr. President, it was not my intention to enter on this discussion, but as no one else seems to start matters upon this valuable paper I wish to call attention with emphasis to one of the great points made in it, and that is that economy in gallons of oil is not economy in lubrication. Under certain conditions, especially with journals under very light pressure at the bearing, as in spindles, the quantity of oil can be minimized without impairment from hot bearings or otherwise, but it is done at the expense of friction, and that friction means the conversion of a great deal of the power used to run that mill into heat. The former method of heating a mill required only one row of steam pipes in the New England

mill in a frame spinning room. The rest of that heating was done by the friction of the spindles — certainly a very expensive method of heating a mill. With the later forms of spindles and methods of lubrication by using a larger amount of a less viscous oil the friction is so much less that the room is heated with a larger number of steam pipes, as in the case of the card rooms and the weave rooms. I have sometimes thought that the entire system between the heating of a mill run by water power and one run by steam power was not sufficiently enforced in practice, because where there is an abundance of water power and the water is running over the dam there is, of course, no appreciable cost in the difference of friction within certain limits, and under such circumstances one might use less oil of a more viscous nature. But practically every mill is operated more or less by steam, and in those cases it is highly desirable that the co-efficient of friction should be reduced to its lowest terms, which can be done by flooding the bearings. The speaker has pointed out how this oil in flooding the bearings need not be lost, and it is to that extent a new chapter in the form of lubrication wherever method may be employed in textile mills by the re-use of oils. Some years ago, largely at the instance of this Association and on behalf of the factory mutual insurance companies, I made a great many experiments upon oils and upon friction, and we found that there was no evidence whatsoever of an oil wearing out. An oil may take up enough metal, especially if used too sparingly on the bearings, to be loaded up with particles of metal, or the animal oils may be oxidized and changed by the effect of the air when it is applied in that manner to the thin film upon the surface of a journal; but as far as wearing out an oil in divesting it of its lubricating properties, I have never been able to discover any evidence on that point or to learn of it from other investigators. I trust that the members will look over this very valuable paper, particularly in its contribution to the value of reducing the co-efficient of friction and the cost of friction by flooding the bearings.

Mr. FREDERICK H. BISHOP. As bearing upon the practical application of the principles spoken of by Mr. COREY, the company that I represent has been manufacturing winding machinery with self-oiling bearings for about ten years, using the ring system, drawing the oil from the reservoirs, carrying it through the bearings and returning it. In that length of time we have made a great many tests in regard to the wearing properties of oil, and as the Secretary said, have not been able to determine whether there is any loss in the lubricating properties. We have shipped machines all over the world, where they have been used by indifferent, inefficient operatives, and in great many cases neglected, the oil running for a long time in a bearing and run over and over again for years in some cases, they not knowing that the bearings required relubrication. We have taken out spindles that have run for eight or ten years and putting gauges upon them found that there was not sufficient wear so that we could determine any more than the wearing off of the machine mark. The result has been extremely successful in the ordinary mill practice, and not only that, but very economical and very effective.

The PRESIDENT. We will pass to the next paper, which will be The Selection of Sites for Cotton Mills, by Mr. ALBERT L. SCOTT, of Lockwood, Greene & Co., of Boston. I take pleasure in introducing Mr. SCOTT.

SELECTION OF SITES FOR COTTON MILLS.

ALBERT L. SCOTT, Treasurer, Lockwood, Greene & Company,
60 Federal Street, Boston, Mass.

MR. STEPHEN GREENE, whom many of you will remember as one of the greatest mill engineers the cotton industry has ever seen, once said in my presence that no single feature of a textile mill was more important than its location and none should receive earlier or more painstaking attention. The value of his opinion has often been borne in upon me, when, in my own experience I have observed the good or ill effects of location upon the fortunes of a mill. The importance of location is becoming more generally recognized as successful manufacturing grows more difficult and will continue to be of commanding interest as long as one site varies from another in operating value.

Just as in other things, there are general maxims, developed as a result of experience, which if followed will reflect favorably upon the success of the manufactory, and which, if disregarded will tend to lessen its profits. It is the purpose of this paper to point out some of these general principles which govern the choice of cotton mill sites.

What is the object of a cotton mill? Primarily, to make money for its owners and all other considerations are generally sacrificed to that. But in addition, thought must be given not only to making money per se, but also to that more indirect form of money making, care for the health and comfort of the operatives. While not generally so considered, I believe that at bottom the underlying fundamentals of good economics and morals are one, and that a healthful mill location and comfort-

able conditions of working and living for the operatives will bring in profits for the mill, none the less real because they are indirect. Too frequently mills are located with too little regard to outside physical conditions, to say nothing of proper housing for the employees. Plenty of land should go with an ideal mill site. The location should be, if possible, high and sightly, so the breezes of heaven may blow over it and the last rays of sunlight reach it. These advantages are more obtainable now than formerly, since in these days of electric transmission and economical steam units sites are possible for mills which a generation ago would not have been feasible, owing to limitations of water power or water supply.

In choosing a mill site, the manufacturer must not only keep abreast of the times, but he must look into the future. As many general elements of success as possible should be centered in the mill site, so that notwithstanding changes in manufacturing conditions, the mill will contain in its location the essentials of success. To secure this a spirit of large mindedness must prevail. The management must occasionally cast its bread upon the waters and expect no return until after many days. Lack of means, especially in new mills, is a frequent cause of improper or inadequate provision for the future, but every effort should be made to so finance the mill as to provide an adequate site.

If there is one thing, therefore, that a manufacturer should be careful about, it should be to keep an open mind on the subject of mill locations. Ordinarily a corporation tries to build a new mill near its other plants, but such a course may not be best. One of the best financial ventures ever made by a mill was that made by the Pacolet Mfg. Company when it built its No. 4 mill at New Holland, Georgia, a hundred and fifty miles from Pacolet. Sometimes a mill should pick up bodily and move. The old Whitfield Mills were never as successful at Newburyport as their successors, the Spartan Mills, have been at Spartanburg. And now to show how values of mill sites change, twenty years or more after the Whitfield Mills ceased operations, cotton manufacturing is again being successfully carried on at Newburyport. It would be interest-

ing to know how successful the Whitfield Mills would have been if it had remained at Newburyport until this day, with the same new equipment as its Southern successor had.

There are three features to be considered in locating a mill. One is its general location. The second is its situation in some particular town or country spot and the third is the particular and exact location on a plat of ground. It is true that the requisites of a good mill site vary from generation to generation and even from decade to decade, but in every period the three general features mentioned above must be considered even though the conditions which made a site attractive at one era might make it valueless at another.

GENERAL LOCATION.

There are in this country four general locations for cotton mills. This does not mean that there are not successful mills outside these confines, but in general mills are situated in these general limits. These general sections are:

New England,
New York State,
The vicinity of Philadelphia extending to Baltimore,
The South-eastern portion of the South.

Ordinarily speaking, if a corporation were to build a cotton mill it would be within one of the four sections named.

It may be profitable to take up in detail the first of the questions to be decided when a mill is to be located. If the new mill is to be an extension or an enlargement of an existing plant, its new location may be fixed in advance, since it may be desirable for purposes of administration to keep the properties together. But in the case of a new enterprise the relations to an established mill need not be considered.

It would seem upon first thought as if this question of general mill location should be given most painstaking thought. On the contrary I doubt whether any part of mill locating is more subject to prejudice or accident. Let us assume for a moment that a certain portion of the Mohawk Valley is the most favorable spot in the country for a knitting mill. No man who was

a resident of Illinois or Tennessee would think of moving, however, to the Mohawk Valley to establish his knitting mill enterprise. A few years ago I journeyed over a large part of the country in company with a New England mill man and a partner in his commission house, looking for the best possible site for his particular form of cotton manufacturing. For that particular industry the general region between Knoxville and Chattanooga, Tennessee, seemed on the whole the best in the country; but because of the distance from New York and the fact that the manufacturer and selling agent wished to live in New England the ideal general location was not utilized.

Formerly there were wide divergences in legal hours of labor, general legislation, wages, etc., between different grand divisions of the American cotton mill world. But the divergences are tending to equalize. The hours of labor are no longer in South Carolina than in New England and labor legislation is remarkably similar in many states, both North and South. Aside from local conditions peculiar to some part of a general section, the tendency is for manufacturing conditions to approach an equilibrium. The South, owing to its warmer climate, can probably always pay less wages than New England, New York State or Philadelphia. She has secured this advantage up to the present, at least, accompanied by a lower general standard of efficiency in her plants.

It is interesting also to speculate as to why cotton manufacturing has started in some sections of the land and not in others. It is easy to see why it started in New England, but it is hard to understand why it has not assumed large proportions in a community like St. Louis. St. Louis is one of the greatest cotton and cotton goods jobbing centers in the country; for years one certain kind of cotton manufacturing, cotton bags, has been successfully carried on there; it is one of the best railroad centers in the land, labor is fairly abundant and the saving in freight on cotton to New England and on goods back to St. Louis amounts to over one cent per pound, and still no cotton factory for the general trade or finishing plant has yet been built there. Probably the reason is that no man strong enough to build a cotton mill has yet arisen in St. Louis who

desired to enter this form of manufacturing. On the other hand, Baltimore, having much the same climatic conditions, poorer transportation facilities, being farther distant from the cotton fields, and having less abundant labor, has been for years a cotton manufacturing center. The explanation probably is that Baltimore provided fewer chances for business enterprise than St. Louis or most western cities and a strong man took up cotton manufacturing and other men followed in his footsteps. Why is it that Westfield makes whips or Holyoke paper or New Britain hardware? Not because these communities were particularly suited to the industry prominent in them, but because the general conditions in the locality were favorable and some man who knew how to make whips lived in Westfield, some one who knew paper lived in Holyoke and an iron maker started operations in New Britain. Lynn became a shoe center apparently for no other reason than because a Welshman, JOHN ADAM DAGYR, in 1750, dissected some French shoes, copied them and taught others how to make them. Lynn was a fishing community and a great many skilled cordwainers lived there. Being skilled in manual dexterity they easily took up shoe making and so a great industry was started at that point.

These illustrations could be indefinitely multiplied in cotton manufacturing as well as in other industries. It seems clear that the decision as to the general locality may be very largely a matter of personal preference or of accident, although now with the development of the industry the limits of the general sections of the country where cotton manufacturing is in a large way carried on are fairly clearly defined.

The decision as to the general location once made, however, the manufacturer cannot entirely humor his fancy as to the *kind* of goods he will make. One would hardly choose Baltimore to manufacture fine goods, nor New Bedford to make duck, although undoubtedly the goods mentioned may be made at either place. But in general, the similar types of cotton manufacturing tend to go together as is evidenced in such manufacturing centers as Fall River, or La Grange, Georgia, or New Bedford.

For certain classes of goods, nearness to the seashore is ad-

vanced as an advantage on account of natural humidity thus secured. This argument does not appear very important, however, since artificial humidification has become so highly developed an art.

In general, certain communities seem to be adapted to certain lines of manufacturing, probably because the town started making some particular class of goods. Once started, the tendency was to continue to make the goods with which the employees were familiar.

LOCATION IN A PARTICULAR TOWN OR COUNTRY SITE.

The second feature of mill location is placing it in some particular town or community after its general location has been determined. There is more elasticity of thinking in this part of mill location than in the former. A Southern manufacturer residing in Spartanburg, let us say, might forego operating a mill in that particular city in his general section, if conditions were more favorable in Georgia, but he would hardly build a new mill in Maine, in another general section, notwithstanding the fact that one of the most successful coarse goods mills in the country is at Biddeford.

While the converse does not hold entirely true, there is but little tendency for a New England manufacturer to build in Philadelphia or in New York State. In other words the town location is generally in the same general section as are the other mills of the company or in which the management resides.

In choosing a particular town for a new mill the personality of the management comes in, since generally the founder of the mill wishes it near his home. This is especially true in sections of the country where the chief mill executive lives at or near the mill rather than in some central city, a system of mill management which to my mind has much to commend it.

The residence of the chief mill executive in the same community as his mills tends to strengthen the bond between management and operative. The management can also throw its influence on the side of law and order and good citizenship, a feature much needed in mill communities. The prevalence of law and order in a community is one of the great factors in a mill's

success, and should be carefully considered when any particular town is under discussion as a mill location. For this reason and to protect the mill from law suits and excessive taxation it is often a very good thing for a mill to be built at or near the home town of the chief executive. In the case of existing mills desiring to enlarge, a site is generally chosen near the existing plants, especially if labor conditions warrant. There are, however, conspicuous examples of a contrary policy, but in all such cases the occasion for the move is largely to tap new sources of labor and secure better operating conditions. Such mills brave the dangers of divided management in order to secure other advantages.

Those corporations which have divided their mills among different localities have avoided the dangers of over concentration of the operatives, so disastrous in Lawrence and Fall River. It does not seem necessary to take such radical measures as some New England mills did a decade or more ago, when they extended South. The wise course to-day seems to be not to create new sections for cotton manufacturing, but rather to decentralize and scatter plants within general sectional limits which are pretty clearly defined. This course has been pursued by MR. ROBERT KNIGHT.

PARTICULAR LOCATION ON A CERTAIN SITE.

But it is in the matter of the particular location upon a spot that the least prejudice comes in and here questions are usually decided absolutely on their merits. Occasionally mills are located to suit the needs of a real estate dealer. I know of one mill in South Carolina which rejected a good site for a poorer one, so as to throw the trade of the mill village to the stores of one small town rather than another. This mill has always been handicapped by the unwisdom of that decision. Occasionally too great regard is paid to some one particular feature of mill location to the subordination of others. At one time most mills were driven from water wheels and it was necessary to locate them on low ground near the water, no matter how dark or inaccessible the site might be. So wedded are we to precedent and things that were, that even to-day mills

are occasionally located in low ground because of nearness to water, when every other consideration make for a different site. In general, except for bleacheries or finishing plants, or a mill where unusual quantities of water are used, it is easier to bring water to a mill than it is to bring a mill to water, and in these days of electric transmission, vastly easier to bring power to a factory than the factory to a dam site.

In making a specific location of the buildings on any mill site there are a few great principles to be observed. The first, at this time, is to be near an adequate supply of suitable labor. This transcends all other considerations whatsoever and all other questions are subordinated to it. Water can be brought long distances, goods, cotton and coal can be hauled as at many New Bedford mills, but labor absolutely must be had. Sometimes it is not well to locate a mill too near the homes of the operatives if the site be low or hot or unhealthful. It may pay to move a little to get better working conditions. But whatever decisions are made should be made with an eye single to that one thing, an adequate supply of suitable labor with operating conditions such that the work will run well.

Possibly next after the question of labor supply comes the question of adequate transportation. A mill should be easily accessible, not only for freight but for passengers. A mill easy to get to will generally be better managed than an inaccessible property. It should have adequate side track facilities, if possible connecting to more than one railroad. Coal should be unloaded by gravity and cotton and goods transported by cars as far as possible. The cheapest way for a mill to move freight is to have the railroad do it.

Next in importance comes light, air and drainage. A mill should, if possible, be on an elevation, like the new Coolidge Mill of the Amoskeag Manufacturing Company for example. Its broad sides should face north and south so as to give the freest entrance to light from the South, and also to catch in warm weather the prevailing breezes. The drainage should be away from the mill, for the easy care of sewage and surface water and to minimize danger of disease. A cotton mill should, among other things, *look well.* The employees like to work in

a good looking enterprise. Sun, air and sightly location operate on the feelings of the operatives like clean windows and paint. It helps create "esprit de corps".

Last in importance, for an ordinary cotton mill, I should place—nearness to water. Water is indeed an absolute essential to a mill, but a beneficent Creator has distributed it so prodigally that it is practically omnipresent in cotton manufacturing localities. It is generally therefore near by and can be easily brought to the mill in quantities sufficient for our present economical power plants. As compared to the other qualifications for a successful mill site, immediate nearness to it is unimportant. Water should always be brought to the mill, if from a moderate distance, and reservoirs, if necessary for condensing and fire protection, constructed, rather than sacrifice a sightly location to go to a stream level. Very frequently a mill can be placed near water or springs and still be on high ground. That is an ideal which should always be sought for.

Even when these general considerations are clearly in the mind of the management, it is not always easy to secure the exact location to bring best results. An undeveloped site seen through underbrush or trees or covered with buildings presents to the average man but few theoretical aspects. It is quite customary therefore to call in at this point an engineer to map out the property and to put the theory of mill location into actual practice. A complete survey should be made showing outlines of the property, railroad, highways, water supply, sewers, lights, etc. If much water is to be used its handling must be worked out. If the mill is to be run by a steam plant, reservoirs must be located, coal trestles determined, side tracks decided upon. This may be done by securing accurate levels at frequent intervals all over the site and then carefully locating mill warehouses, power plant, water supply, sewerage, side tracks, village, streets, etc., all on a preliminary outline plan based on the information gained in the survey. It is only by some such method that the plant may be seen as a whole, its future development planned for, and false steps in so far as possible avoided. It is, I am sure, the experience of every mill engineer, as it has been my own, that more trouble in administration or costs of

construction or difficulties in extension comes from poor planning at the beginning of the enterprise than from any other one source. I know of one mill which has its picker building where its power plant should be and so arranged as to make the extensions it now desires to make extremely difficult. Another has its warehouses where it now wishes to build a weave shed, a third is too near the edge of its property. The inadequacy of power plants is almost a truism in cotton mills. It seems to be peculiarly difficult to think of a power plant in terms sufficiently elastic to provide for the future of a mill property. While all these future developments cannot be foreseen, many can be provided for if sufficient study is given at the beginning.

With these general features of plant location in mind, it may be interesting to take up some specific hypothetical cases of plant location and see what ideal conditions ought to prevail.

Let us suppose a New England corporation wishes to build a mill in New England on medium weight goods of plain weaves. What consideration of locality should influence it? First, as previously stated the mill should be located near a good supply of cheap and reliable labor. Some manufacturers like to be in or near communities employing large numbers of men at low wages, so they can secure the services of the women and girls. But the time is rapidly approaching when cotton manufacturing must stand on its own feet in this regard and I believe a location for a mill a little away from congested centers, yet easily accessible, is most desirable.

It is claimed that help want to be in a place of some size, to get the excitements of a city, go to moving picture shows, etc. This may be true to a certain extent, yet my observation is that a mill with good management, where the work runs well and an air of confidence prevails, can secure help of good quality, even though it is not in the so-called centers. It must not be too far away, however, and should be accessible to the larger places by trolley. Such locations may require the mill to furnish tenements, which many mill managers dislike and which involves additional expense. If a village owned by the mill helps the labor question it justifies itself and the possession of mill villages may, in the hands of wise management, be a means not only of

securing and holding help, but also of advancing them in the scale of living and making them better citizens, a consummation greatly to be desired. Certainly a comparison of the employees in some New England or Southern mill town, where the village is owned, controlled and operated in a quasi-paternal manner by the mill, and the employees in a large center like Baltimore or Lawrence where tenement conditions prevail, redounds greatly to the advantage of the village community.

The more employment the mill can give to all the family the easier it is to secure help. The unit of labor in cotton manufacturing is the family. In no other industry can all its members, young or old, male and female, be so easily employed. This fact is frequently overlooked by legislators and by mill managers. It is of course largely the cause of child labor and other evils in the industry. Employment can be more easily given to all the family in a mill village, child labor controlled, and less cause given for dissatisfaction, than if the operatives are left a prey to real estate conditions. To operate a village successfully requires a higher and more generous minded order of management than it takes to merely run a mill. But with such management the ideal location for such a mill as we have mentioned is the small village, controlled and kept healthful by the corporation, located more or less near a large center.

Next to a good supply of labor comes the question of

TRANSPORTATION.

Competition in railway service is desirable but often hard to secure, especially in New England. Arrangements should be made with the railroad in advance as to rates on coal, cotton and goods, the mill site should be chosen so as to make side tracks for coal and cotton available with a minimum of trucking and a point should be chosen with convenient passenger schedules to the nearest center. This latter point is more important than most people think. A mill hard to get to, no matter how ideal its particular location may be, is always at a disadvantage with some easily accessible mill. Any of you who have had to administer an inaccessible mill will recognize the truth of this statement.

Suppose that instead of medium weight plain weaves, it was proposed to find the best site in the country for a fine goods mill. The minds of most of you would probably turn to New Bedford or some favored portion of Rhode Island or Connecticut. Yet two of the foremost manufacturers of the South are just beginning to operate at Greenville, South Carolina, mills designed to make as fine goods as are manufactured in the United States. Suppose the case were a hosiery mill. Certain parts of New York State or the vicinity of Philadelphia would occur to most of us, but the hosiery mills with the lowest costs to-day are probably near Chattanooga, Tennessee. One would probably say a mill to make standard drills should be located South, yet possibly the most consistently successful mill over a period of years on those goods is at Biddeford, Maine.

Heavy ducks ought to be made where cotton is plentiful and cheap, yet no one would dare to say that duck mills should cease to operate in Maryland or Massachusetts.

All of this goes to show that general conditions are equalizing themselves. Personally I think that New England is best adapted to make fine goods, especially fancies and most grades of colored or bleached fabrics; underwear manufacturers will do well to consider New York State. For certain grades of colored cotton and knit goods Philadelphia is still the manufacturing center. For plain weaves of medium weight goods and for medium yarns the South occupies a commanding position, while as good duck as is made in the world is produced at Baltimore. Many of you may not agree with me in these general conclusions and it is very difficult to demonstrate definitely the reasons for these deductions because so much of a mill's success depends upon the personality of the management. I can only offer these conclusions as the result of my observation and experience.

It is probably not so much the general location as the particular location which influences the fate of a mill, and the merits of the particular location are so welded with the activities of the management that it is next to impossible to separate them. But given able management the mill located with a far-seeing eye to the future, with proper consideration to healthfulness and

ease of operation, will assuredly surpass a plant not so fortunately placed.

The PRESIDENT. Are there any questions which any of you care to ask Mr. SCOTT? If not, we will pass to the next paper, Humidifiers and Their Results, by FREDERICK W. PARKS, president of The G. M. Parks Company, of Fitchburg, Mass. I introduce Mr. PARKS.

The printed form accompanying the request for information read as follows:

THE INFLUENCE OF HUMIDIFIERS IN OUR MILL HAS BEEN AS FOLLOWS:

(Please give figures if possible, otherwise estimate percentages.)

1. On production
2. On floor sweeps
3. On invisible waste
4. On second quality goods
5. On static electricity
6. On broken ends in spinning
7. On loom shut downs
8. On strength of yarn or goods
9. On weight of goods
10. On mill temperature in hot weather
11. On health of operatives, good harmful unnoticed
12. The net return on the investment we estimate to be
13. Were humidifiers installed when your mill was built or did you equip later?
14. Is your equipment complete or only in some departments? If incomplete kindly state which departments are equipped

Remarks

Name of Mill
Location

Question 1.

PRODUCTION.

Number of answers, twenty-nine.

Ten of these claimed improvement but quoted no figures.

Nineteen gave percentages.

One ramie mill and one fine cotton mill claimed 25 per cent. increase.

One coarse cotton mill claimed 20 per cent. in card room.

Two cotton mills claimed 15 per cent. general increase.

The other fourteen mills ranged from 1 per cent. to 10 per cent. increase.

No mill reported decreased production because of the installation of humidifiers.

Question 2.

FLOOR SWEEPS.

Number of answers, twenty-four.

One of these claimed no improvement, although admitted in their remarks, "on the whole we have been benefitted very much."

Ten claimed improvement but gave no figures.

Five admitted they really did not know from figures, but believed there had been general improvement in running conditions.

The balance claimed savings of 1 per cent. to 10 per cent., averaging around 2 per cent., although one report on card room equipment only stated that floor sweeps had been reduced 50 per cent.

No mill reported an increase of floor sweeps because of humidifiers.

Question 3.

INVISIBLE WASTE.

Number of answers, seventeen.

Ten simply stated that improvement was noted. The same mill mentioned under question 2 as reporting on a card room equipment only, gave under this heading a saving of 20 per cent.

The balance reported savings of .03 per cent. to 5 per cent., and here as in other places the question arises as to whether this percentage refers to total cotton, or former amount of invisible waste. Some of the smaller percentages like .03 per cent. must obviously refer to total cotton.

No mill reported an increase of invisible waste because of humidifiers.

Question 4.

SECOND QUALITY GOODS.

Number of answers, seventeen.

Seven simply stated improvement, giving no figures.

Two coarse goods mills reported 25 per cent. reduction, presumably referring to former amount of seconds.

One other mentioned 15 per cent. and three mentioned 10 per cent.

The others ranged from 1 per cent. to 3 per cent.

No mill reported an increase of second quality goods.

Question 5.

STATIC ELECTRICITY.

Number of answers, twenty-eight.

This is a question which could hardly be answered by figures or percentages.

All mills indicated by their answers either a decided decrease or absolute prevention.

No mill reported an increase of static electricity because of humidifiers.

Question 6.

BROKEN ENDS IN SPINNING.

Number of answers, twenty-eight.

One yarn mill reported 50 per cent. improvement.

Six mentioned 10 per cent. improvement, while the balance merely indicated a general improvement.

No mill reported an increase of broken ends because of humidifiers.

Question 7.

LOOM SHUT DOWNS.

Since all the mills replying were not cloth mills, there were but thirteen answers to this question.

One reported 25 per cent. improvement.

One reported 10 per cent. improvement.

Two reported 5 per cent. improvement.

Balance reported improvement but gave no figures.

No mill reported an increase of loom shut downs.

Question 8.

STRENGTH OF YARN OR GOODS.

Number of answers, twenty-four.

Three reported no improvement.

One Southern cloth mill reported 15 per cent. improvement.

One ramie mill reported 10 per cent. improvement.

One Northern gingham mill reported 5 per cent. to 10 per cent. improvement.

Three cotton mills reported 2 per cent. to 6 per cent. improvement.

Balance admitted improvement, but gave no figures.

No mill reported harmful effect.

Question 9.

WEIGHT OF GOODS.

Number of answers, sixteen.

Two claimed no improvement.

Two reported easier to hold goods uniform.

One cotton yarn mill reported 10 per cent.

Balance ½ per cent. to 6 per cent.

Possibly the fact that so few answered this question is because it is a trifle incriminating, but no mill reported loss of weight because of humidifiers.

Question 10.

MILL TEMPERATURE IN HOT WEATHER.

Number of answers, twenty-eight.

Fifteen of these said "cooler," "great help," etc.

Thirteen quoted degrees cooler, one case being 15 degrees, balance ranging 5 degrees to 10 degrees.

One old mill equipped last fall, reported that this is the first summer they have had no trouble from their spinning room help staying out in hot weather. No mill reported an increase in temperature because of humidifiers.

Question 11.

HEALTH OF OPERATIVES.

Number of answers, thirty-one.

Ten of these reported "unnoticed."

Twenty-one reported "good."

None reported "bad."

These figures while not at all conclusive, are interesting in view of the agitation against artificial humidification in some quarters. Possibly the mill officials might not be the first to notice any ill effects on the health of operatives provided artificial humidification were otherwise beneficial from a manufacturing standpoint. The fact remains, however, that ordinary practice so far in this country does not demand a relative humidity so high as to be unhealthful.

The entire absence of artificial humidity during the heating season in our climate certainly permits injury to health of operatives by dust, fly, etc., which humidification to a proper extent will prevent.

Question 12.

RETURN ON INVESTMENT.

Only two answers to this question.

Possibly it is the hardest one on the list to answer, due to the numerous variables.

One of those answering quoted 25 per cent., the other 15 per cent. I am inclined to believe, however, that the mill quoting 15 per cent. as their return on their investment was too conservative, because this mill admitted a 5 per cent. increase in production, 10 per cent. reduction in floor sweeps, 10 per cent. reduction in broken ends, which of course affected the seconds, and further, stated that no mill can afford to be without humidifiers.

Perhaps the most comprehensive statement on this question of investment came from a Northern yarn mill, built two years ago, and equipped complete at that time. I quote as follows:

"Our invisible waste for 1911 was 1¾ per cent. which is very low. Our production was 93 per cent. Our regain from cotton to yarn averaged 6 per cent. on 2,000,000 pounds of cotton per year. Our humidifiers cost us $10,000."

Now 6 per cent. of 2,000,000 pounds of cotton at 10 cents a pound is worth $12,000. The system thus more than paid for

itself the first year, and if you figure the saving as finished yarn instead of cotton, the investment looks all the more attractive.

Question 13.

WERE HUMIDIFIERS INSTALLED WHEN YOUR MILL WAS BUILT OR DID YOU EQUIP LATER?

Number of answers, thirty-nine.
Nineteen of these were old mills, equipped after erection.
Seventeen were equipped when built.
Three were plants unequipped at first, humidified later, and additions equipped as built.

It is interesting to note that nearly half of those mills answering this question were new mills equipped when built, indicating the general thought that a new mill, in order to compete, must have every modern appliance. These new mills can, of course, give no comparative figures, as they never ran without humidifiers.

Question 14.

IS YOUR EQUIPMENT COMPLETE OR ONLY IN SOME DEPARTMENTS?

Number of answers, thirty-six.
Two were equipped in weaving only.
One was equipped in carding only.

Balance reported complete equipment, which is a fair measure of the growth of the idea that a textile plant should be equipped throughout. The past few years have been a decided change in this regard. Time was when one man would equip his weaving and nothing else, another his carding and spinning, but not his weaving, the next his carding only. Each would claim his selection the proper point to apply humidity. Time is proving that each was right, for nearly every process is a drying-out one on the fibre except in very favorable weather, unless artificially prevented.

This information as to field tests was obtained from mills equipped with the following systems of humidifiers:

American,	Garland,
Bell,	Hygrosso,
Bentz,	Kelley,
Carrier,	Tillotson,
Cramer,	Turbo.
Dupuis,	

Lack of space prevents the illustrating of each by cuts, but a brief description of each might read something as follows: —

The American system uses water under pressure, supplied by a pressure pump through pipes to heads distributed about the mill. Some of the water is turned into spray inside the head by impingement, the balance flowing back to the pump by gravity to be used again, while the spray emits from the casing of each head into the room.

The Bell system consists of a casing surrounding cloths stretched vertically on frames. Water, passing over the cloths, is absorbed by air from the room, blown through the casing by means of a fan located in the side of the casing and driven either by a belt or a small electric motor.

The Bentz machine blows air by means of a small fan through a chamber, the bottom part of which is filled with water. Submerged in the water is a steam coil for winter use. The air is impinged onto the surface of the water by vanes, causing a washing and mixing effect.

The Carrier system is a central humidifying plant, using the old idea of the central fan heating plant to furnish humidification alone or humidity and heat combined. The system comprises one large central fan, an air washer and humidifier, separator, heating stacks or coils and flues or ducts to distribute the air to the various rooms.

The Cramer system is similar in principle to the American, with modification as to design. The same house also markets a central fan type of installation like the Carrier. Both the Cramer and American systems furnish heads with individual

fans attached to increase the air circulation, thereby increasing the capacity of the individual head.

The Dupuis humidifier is a specially designed steam valve to emit live steam into the rooms from steam pipes.

The Garland head works on the atomizer principle, similar in principle to the nasal douche. Two pipe lines are required, one for compressed air supplied by a central air compressor, and one for water not under pressure.

The Hygrosso head is operated either by belt or small motor. A portion of the water flowing upon a rapidly revolving disc is turned into spray. The water not disintegrated is drained off by gravity, while the spray is picked up by air from a fan mounted on the same shaft as the revolving disc.

The Kelley is a compressed air head, with the air and water both under pressure, joining together and traveling in the same pipe a few feet until they come to the head itself, where atomization takes place by impingement on a small metal disc.

The Tillotson principle is that of a fan and brush within a circular casing. Water fed to the brush is disintegrated and picked up by the air from the fan. The fan and brush are both on the same shaft and may be run either by motor or belt.

The Turbo is another of the compressed air family. There are two pipe lines, one for air and one for water, and the water is not under pressure. This head works on the principle of the injector plus that of the turbine, water being lifted an inch or two out of the water pipes into the head and there pulverized by the high initial velocity of the air due to its pressure.

These comprise the list of best known humidifiers at present marketed or in use. There is certainly a wide range of principles of operation from which the possible purchaser may choose.

I shall not take your time to rehearse the history of this idea of humidification because you have all heard about it many times before:—

First, the damp climate of Lancashire, Eng., where it was thought no artificial humidity was required, then the watering pot to wet the floors, the troughs of water in the floors, the

steam pots, and all that. One fact of passing interest, however, is that the mills located in that same favorable climate of England are putting in humidifiers and have been for some years. They do not need artificial humidity so many days in the year as we do, but, like a spare shoe for an automobile, when needed it is extremely useful.

To return again to the reports received from the mills, I want to quote extracts from a few of the remarks written by practical mill men: —

1. We have never kept records, but without humidifiers we could hardly walk through the card room alleys, so much good cotton was on the floor.
2. Could not run in dry weather without them.
3. On the whole benefited very much.
4. Humidifiers offset bad weather conditions. Our production increase (7 per cent.) due not only to benefit to stock in process but to improved feelings of operatives.
5. Never been without humidifiers. Would not shut them down to find out the answers to your questions.
6. Equipped from starting, therefore no method of comparison, but work runs bad when humidifiers are shut down for a short time.
7. A Massachusetts mill writes, "enabled to maintain same production in 54 hours as 56 hours per week formerly. Can start cards on high speed at once on cold mornings. It formerly took one hour to one and one-half hours to get them started."
8. Know they are a great help.
9. Consider indispensible.
10. Would not be without them for anything.
11. Believe the reason the Philadelphia section never succeeded on cotton was lack of humidifiers.
12. Great believers in humidifiers.
13. No cotton spinning mill can afford to be without.
14. Have no data but am sure work runs better.
15. Would not do without for many times their cost.
16. No data, but know for a fact humidifiers are of great value.
17. No data, but believe as important as coal to the engine.
18. No data, but no mill should be without.
19. Work all runs better.

20. More than satisfied.
21. Not run long enough to give figures but could not be without.
22. A mill without humidifiers is impossible.
23. Could not keep running without humidifiers. We use a preparation of pine oil in winter which prevents colds among the weavers and makes our weave room smell like a pine forest.
24. Could not get along without.
25. No figures, but cannot keep up production when humidifiers are stopped.
26. Would not go back to old days without humidifiers.
27. No figures, but general howl if shut off.
28. No data, but believe absolutely necessary.
29. No data, but would not think of being without.
30. Keeps dust down.

A word of thanks and appreciation is gratefully extended to those mills who kindly furnished the information from which the foregoing analysis and remarks are compiled. It is worthy of note that not one concern of the eighty-one that replied, wrote unfavorably of artificial humidification, or answered unfavorably any one of the questions asked.

One well known mill agent, in the North, told me that from his experience in several mills, he would gladly take as his salary what the books would show as a saving derived from the use of humidifiers in any fair sized mill, and he draws a good salary, too.

Rust may be caused either by precipitation of moisture discharged from humidifiers, or by condensation of atmospheric moisture on cold metals. Precipitation may occur with any humidifier system, no matter of what make or design, but should not occur at all if proper care is used in operating most of the systems now on the market.

Condensation will surely occur in cold weather with any humidifier system if the machinery is allowed to become cold, and then the heat and humidity are turned on together. Time should properly be allowed for the metal to absorb heat up to room temperature before turning on humidifiers. This opportunity for rusting generally occurs on Monday morning, when the mill has been allowed to cool off over Sunday.

In the writer's personal opinion, much of this rusting has been improperly charged up against humidifiers, when, as a matter of fact the rusted machinery, on investigation, might not have been within reaching distance of any humidifier. Rusting may take place in an unhumidified room just as surely as in a humidified room if the atmospheric conditions are favorable.

Gentlemen, the evidence so far as this case is concerned, is all in. The prosecution has presented its case. The defence has defaulted. There is but one verdict. There can be no other from this testimony: humidifier results are to be entered on the credit side of the ledger; there are several kinds of humidifiers, each with a sufficient number of "credits" to warrant your attention; there are several different principles involved — sufficient to satisfy you mechanically; there are a sufficient number of honorable houses in the business to satisfy your desire for competition; there are various accessories with varying degrees of importance, just as there are varying costs in installation, operation and up-keep.

Humidifiers have made it possible to operate cotton mills successfully in other sections of the country than those originally supposed to be particularly adapted to cotton manufacture. In this way humidifiers have been a valuable aid to the industry, besides improving the operating conditions of plants already favorably located.

In modern high speed textile manufacture, nothing has helped to solve so many vexatious problems, problems created by these self-same high speeds — as humidifiers; and solved them, too, without in turn becoming another problem in themselves.

Let the purchaser then, study his own problem from his own particular angle. Let him select the humidifier that best solves that problem.

For while each humidifying contractor may not be sailing the same course, the destination of each is undeniably the port of "results" for the consumer.

Else, why the voyage?

The PRESIDENT. Are there any questions you would like to ask Mr. PARKS?

Mr. FREDERICK A. FLATHER. I am very much interested in this very valuable paper. The evidence is of course overwhelming, as we might expect it to be. I would like to ask, however, if you sent out any inquiries as to precipitation and rust trouble?

Mr. FREDERICK W. PARKS. I was as careful as possible, as you will notice from that list of questions, to make every question a general one which could be answered by the owner of any humidifier system. This paper was not written with the intention of advancing any one particular humidifier, but it was merely written in the interest of humidification in general. There are any number of questions — perhaps we might fill the whole paper with the list — questions in regard to points such as that which you mention; but all those specific points were purposely avoided.

Mr. FREDERICK A. FLATHER. Is not that one of the most important questions in connection with humidification today?

Mr. FREDERICK W. PARKS. I should perhaps rather defer that to some practical mill man here, whose judgment would be infinitely better than mine on that point.

The PRESIDENT. Are there any other questions? If not, we will hear the report of the Committee on Resolutions; Mr. HOBBS, the chairman.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. FRANKLIN W. HOBBS. Mr. President, the Committee on Resolutions report as follows:

Resolved: That The National Association of Cotton Manufacturers presents its thanks to His Honor, BRYAN F. MAHAN, Mayor, and to His

Excellency, SIMEON E. BALDWIN, LL. D., Governor, in appreciation of their cordial welcome to the City of New London and the State of Connecticut, in which this Association is holding its ninety-third meeting.

Resolved: That The National Association of Cotton Manufacturers extends its thanks for valuable papers contributed to its ninety-third meeting by Messrs. S. W. FLESHEIM, J. A. JEFFERSON HAYES, SAMUEL GUYTON MCLENDON, ALBERT L. SCOTT, ARNO SCHMIDT, HOWARD S. REED and WILLIAM W. WHEELER.

Resolved: That this Association expresses appreciation for courtesies extended by the Park Commissioners of New London, by the New London County Historical Society, by the Norwich Golf Club and by the Shennecossett Golf Club.

Resolved: That the Association extends its thanks to CHARLES R. TOWSON, Industrial Secretary of the International Committee of the Young Men's Christian Association, for his address on the work now carried on by the Young Men's Christian Association in connection with the human element in manufacturing industries.

Resolved: That this Association continues to favor the passage of reasonable workmen's compensation laws.

That such laws in the various states should be as far as possible uniform in their provisions.

That such laws should not comprehend any plan or compulsory insurance.

That such laws should not comprehend any plan by which the state itself undertakes the business of insurance, the socialistic principle of which this Association regards with disfavor.

Resolved: We continue our protests against the defective ginning and baling of American cotton as constituting the greatest economic loss of any product of this country, causing irremediable impairment of the staple and submitting an excess of foreign material which fails to protect the contents to such an extent that the recently adopted bill of lading disclaims responsibility for injury to cotton in transit; the whole system imposing upon manufacturers in the form of waste and tare an excessive amount of raw material unavailable in the production of goods.

Resolved: We submit that the American cotton crop is the only commercial form of the staple which is not prepared for shipment at the

ginnery, and that the means for its suitable ginning and baling are well known as feasible and profitably available.

Resolved: We claim, in view of the excesses and variations of tare, that net cotton is the only fair basis for its merchandising, in which the practice of some other cotton manufacturing countries furnish commendable examples.

Committee on Resolutions,

FRANKLIN W. HOBBS, *Chairman*,	LYMAN B. GOFF,
WILLIAM M. BUTLER,	S. HAROLD GREENE,
FREDERICK A. FLATHER,	W. FRANK SHOVE.

Mr. FRANKLIN W. HOBBS. We submit these for the action of the Association, Mr. President.

The PRESIDENT. I will entertain a motion that the report be accepted and placed on file.

On motion of Mr. JAMES STRANG, the report of the committee was accepted.

The PRESIDENT. How shall we act on these resolutions? Has anybody any objection to having them adopted as a whole? We have an able Committee on Resolutions and I think the resolutions have been worded very carefully.

Mr. FRANKLIN W. HOBBS. I wish to say, Mr. President, that the only members of that committee who were not present were Mr. BUTLER and Mr. SHOVE; the other four members unanimously agree to that report.

Mr. JOSEPH MERRIAM. I move that they be adopted as a whole.

The motion being seconded was unanimously carried, and the resolutions were declared adopted.

The PRESIDENT. We stand adjourned, until this evening at 8.15 P. M.

FIFTH SESSION.

WEDNESDAY EVENING, SEPTEMBER 11, 1912.

The Association met at 8.15, President GREENE in the chair.

The PRESIDENT. The meeting will come to order. The first paper on the evening's program is that on Cotton Growing in India, by Mr. ARNO SCHMIDT, Secretary of the International Federation of Master Cotton Spinners' and Manufacturers' Associations, Manchester, England, which will be presented by the Secretary in the absence of the author.

The SECRETARY. The International Federation has sent Mr. ARNO SCHMIDT, their Secretary, on two long journeys, the one to Egypt, where he thoroughly investigated the Egyptian cotton, and by consent his paper on cotton growing in that country was presented at the spring meeting, being, I believe, the first time that this Association ever had a paper which had been previously presented before some other organization, but his investigation was made in such a thorough manner and his paper contained so much information on the subject which was not available through other sources that the Board of Government considered it advisable to print it in the Transactions of the spring meeting. Mr. SCHMIDT afterwards was sent to India on a similar errand and made an extended tour over that immense country which presents such a striking contrast to

Egypt whose cotton crop has until late been raised in that triangle of the delta of the Nile of 170 miles on a side. He traveled over 6,000 miles throughout India, taking many photographs, with which the paper is profusely illustrated. These papers by Mr. SCHMIDT have commanded the favorable criticism of the cotton manufacturing world in England and throughout Europe, and therefore I am justified in the belief that they will commend themselves to you. Some of our members imported some Indian cotton a little over a year ago, and I think if they had had the information in that paper they would have been saved serious losses from the production of unsatisfactory goods.

COTTON GROWING IN INDIA.

ARNO SCHMIDT, Secretary International Federation of Master Cotton Spinners and Manufacturers' Associations, Manchester, England.

The purposes of this second visit to India, made in December, 1911, and January, 1912, were:

To further investigate the possibilities of Cotton Growing in India specially with a view to the study of the question of establishing cotton buying and ginning agencies in the long staple cotton growing districts.

My stay in India, owing to business demands at home, was limited to seven weeks, but as my visit was kindly notified by the India office in London to the numerous officials in India connected with agriculture, I was able to arrange an almost complete itinerary of the more important cotton-growing provinces. The information which I have collected has been communicated to me mainly by the technical agricultural experts of the Government, the Deputy Directors of Agriculture; but I also made it a point to inspect in each province fields belonging to farmers, to question them where possible, and to elicit information from ginners and merchants.

I desire to acknowledge at the outset the great assistance rendered me by the deputy directors, and to emphasize the fact that during the short time that has elapsed since their appointment (these posts were only created in 1904–5) much valuable work has been accomplished.

It was only with reluctance that I ventured to give my own opinion on some of the subjects in this report, but I took the

precaution to submit my views, prior to publication, to several Indian experts of many years' standing, and in most cases have my conclusions also been endorsed by the cotton mill owners at Bombay and Cawnpore, where I had the time to convene meetings.

The view of an unprejudiced outsider often proves valuable,

FIGURE 1.—MAP OF INDIA, SHOWING ROUTE OF THE WRITER.

and this will, I hope, serve as a sufficient reason for opinions given, after so short a stay in the country. A fresh eye is an important factor in investigation.

During my seven weeks' travel in India, I visited Surat, Mirpukas, Lyallpur, Gurdaspur, Aligarth, Cawnpore, Nagpur, Akola, Bombay, Dharwar, Hubli, Gadag, Madras, Virudupatti, Koilpatti, Calcutta, Cawnpore and Bombay, a journey of 7,982 miles, and as my time was very limited I made most of the railway journeys by night.

As this report is intended not only for the spinners of the world, but also for the Colonial Cotton Growing Associations of the European Powers, I have included some technical agricultural notes which might not be of direct interest to the cotton spinner. The summary and conclusions will be of more interest to the spinner.

To generalize on cotton growing in India would be unprofitable, for the climatic and soil conditions of this vast country vary perhaps more than in any other country in the world; for example, in the north of India the cotton crop is being harvested in October, whilst in the south the seed is being put into the ground at that time. Almost all the year through, cotton is being picked somewhere in India. For these reasons I am compelled to treat each cotton-growing tract separately. I shall begin with a description of the conditions in the Madras Presidency, as the advent of the new kind of cotton, "Cambodia," is of far-reaching and immediate importance to the cotton spinners of the world, and to the cotton producers of India; then I shall deal with the Central Provinces, owing to the excellent system of administration existing in these parts. Bombay Presidency, the Punjab, and the United Provinces, as well as Eastern Bengal and Assam, will also be dealt with.

Finally, I shall submit the conclusions at which I have arrived as the result of my investigations.

MADRAS PRESIDENCY.

The principal cotton growing districts are: Madura and Tinnevelly, and Coimbatore in the south of the Presidency, a

portion of Kistna which abuts on the Deccan, and the Ceded districts (Bellary, Anantapur, and Cuddapah.)

"CAMBODIA" OR "TINNEVELLY AMERICAN."

The outstanding feature in agriculture in this district is the recent introduction of Cambodia cotton; it closely resembles American Upland, and is probably of the same species; it is one-inch staple, uniform in length, glossy, somewhat creamy in appearance, and its fibre is fine, yet strong. This cotton had been detected some five years ago accidently by Mr. A. STEELE, of Messrs. A. and F. Harvey & Co., at their gin in Virudupatti. I am told that the merit of introducing and spreading this cotton over the south of India is to a very large extent due to Mr. STEELE.

When Cambodia cotton which is known in Liverpool as "Tinnevelly American," was first detected, it had a ginning out-turn of 44 per cent. (44 pounds fibre in 100 pounds seed cotton) but it fell quickly to 33 per cent. This percentage has been maintained during the last few years, and it is anticipated that it will be increased again by more careful cultivation. Cambodia is the name given to this cotton by the Agricultural Department, which traces its origin to Indo-China, but no doubt it came originally from the United States. Mr. H. SAMPSON, Deputy Director of Agriculture, Southern Division, Madras, writes about this cotton in the "Agricultural Journal of India," Volume IV., Part 4, as follows:

"The introduction of Cambodia cotton into the Madras Presidency is perhaps one of the most striking instances in India of how readily the ryot will take up a new cultivation, if once he is satisfied that it pays him to do so. In this case it is still more remarkable because cotton is no new crop to the ryot, and the cultivation of this Cambodia cotton is very different to the methods of cotton cultivation known for generations to the ryots of the Southern districts. The indigenous cotton has always been essentially a rain-fed crop of the black cotton soil. This, in the dry climate of the south, cannot stand heavy manuring, which tends to keep the root system near the surface. Cambodia

cotton, however, if it is to pay, has to be grown as an irrigated crop on heavily-manured soil, and if anyone had five years ago told the ryots of Tinnevelly, Ramnad and Madura that in five years' time their best garden lands (*i. e.*, heavily-manured made soils under well irrigation) would be sown with cotton as an irrigated crop, the very idea would have been laughed to scorn. Yet this is what happened, even to the ousting of such profitable crops as chillies and tobacco.

"It is, however, in this climate, much hardier and more vigorous, and gives a stronger and fuller lint than either newly-introduced American or acclimatised Dharwar American. Its root system closely resembles that of American Upland, viz., a tapering tap-root with strong feeding roots given off near the surface, and differs greatly from that of the indigenous cottons which have a long, slender, tap-root with very slender feeding roots penetrating deeply into the soil. It can be understood, therefore, why it is that Cambodia responds so readily to irrigation, and how, since the crop is protected from drought, it is possible to manure heavily and obtain very heavy yields, and it can also be understood why this crop, if grown on black cotton soil with the aid of rain alone, cannot resist prolonged drought. On well-manured land under irrigation the yield is usually stated to be from 1,250 pounds to 1,600 pounds of Kappas (seed cotton) and never less; while yields as high as 2,500 pounds have been reported. With a ginning percentage of 33 to 35 per cent. of lint, an acre will at this rate, give about a bale of lint (500 pounds) or over."

In 1907–8 the crop amounted in all to 40 bales of 500 pounds and the seed obtained from it was eagerly sought for. In 1909 the crop was 1,650 bales; in 1910, 7,500 bales; last year it was 30,000 bales, and this year, it is estimated, the crop will be at least 80,000 bales of 500 pounds. (It must be noted that the Indian bales coming from the south weigh 500 pounds, whilst the usual Indian bale only weighs 400 pounds.)

Cambodia must not be grown too near rice fields, as the large quantity of water necessary for rice cultivation makes impossible the prevention of the saturation of the adjoining Cambodia fields and the bringing up of salt.

In view of the recent developments with regard to the purchase of cotton plantations in the United States of America and

Africa by cotton spinning firms in Europe, I made inquiries as to whether the Government would welcome European spinners in acquiring land in districts newly developed for irrigation. Anglo-Indians told me that such a step would probably not be welcomed by the Government, and on enquiry at the Department of Revenue and Agriculture in India I was informed that "if any definite proposals were laid before the Government they would receive careful consideration." In this connection I may mention that one native gentleman offered me 1,000 acres of cotton-growing land in one of the native states in the south of India, situated about six miles from the railway. He has himself leased the land from a native chief on the following terms:

2 rupees assessment per acre per annum for six years, and
6 " " " for each succeeding year.

The lease is only for thirty years. The land can be acquired on a permanent ownership at the price of 6 rupees per year. I was told that 20,000 acres, which, however, are not yet growing cotton, could be obtained at a yearly payment of 6 rupees per arce on permanent ownership. The transfer fees and preliminary expenses (which would entail no doubt a number of baksheesh) are estimated at 3 rupees per acre.

This quick increase in the production shows how eagerly the people have taken up the cultivation of cotton. Everywhere in the south one can notice wells being bored simply for the purpose of being able to grow this cotton. Cambodia has replaced such crops as chilli, tobacco and rice (on poor land). It requires only two or three irrigations in addition to the usual 27 to 30-inch rainfall. The cost of construction of a well sufficient for supplying the water for two acres is about 300 to 500 rupees. An advantage in connection with the cultivation of this cotton is that it does not encroach upon the land devoted to the ordinary Tinnevelly cotton. Cambodia can be grown only in red soil, whilst the Tinnevelly flourishes in black soil; thus the crop of the latter will this year be again 90,000 bales. The average yield of Cambodia cotton is 500 pounds of lint per acre,

an extraordinary yield, if one remembers that cotton in India does not yield more than 90 pounds to 100 pounds on the average.

Sowing generally takes place in October, broadcast sowing is practically the only method. Prior to the sowing the soil is ploughed twice or three times by means of the ordinary wooden native plough. Ten pounds of seed are required for one acre; two or three times the field is weeded by hand. Two or three waterings are required during the growing season, and the water is obtained by means of primitive lifting machines. Picking begins in the middle of February, and is carried on every alternate day. The pickers, who are mostly women, are exceedingly careful in their work. This is quite contrary to what is generally the custom in India. Cotton in the south of India is only picked early in the morning, when the dew is on the plants, and this is done in order that no dry leaves or other impurities may be mixed with the cotton. Picking ceases at 10 A. M., as by that time the temperature is very high, and the plants get dry and brittle. In order that the cotton may not retain any excessive moisture, it is the general custom of the cultivators to spread the picked cotton along the side of the field and expose it to the sun.

The cultivator is described as a hard working and intelligent man; it is, however, interesting to note how suspicious he is of Government action. The Government endeavored to find out the area that is grown under Cambodia, and many farmers, fearing that Government wanted to levy a special tax on this remunerative crop, pulled up the Cambodia plants.

The ginneries are all in the hands of well-known European firms. Cambodia requires a slower ginning process than the ordinary Tinnevelly. So far only roller gins are used, and I was told that the saw gins, such as are used in America and also in Dharwar, south of the Bombay Presidency, would cause too much damage to the fibre. Whilst the rollers of the gin for Tinnevelly cotton are run at a speed of 1,000 revolutions per minute, they must not go faster than 750 revolutions per minute

for Cambodia. This accounts for the difference in price in the cost of ginning, Tinnevelly being charged at 5 rupees per 500 pounds, whilst Cambodia pays 5 rupees, 8 annas, including baling. Cambodia seed, being bigger and more fluffy than Tinnevelly, requires a broader grid in the gin. I may remark here that for this reason it will be an easy matter to keep the seed of the two kinds of cotton apart in the ginneries. The gins begin working in the middle of February and do not finish until Christmas. From April to September two shifts of twelve hours each are working. The wages for women at the gin are 4 annas per day, for men performing light work 8 annas, for those performing hard work 12 annas.

There are only two grades of Cambodia cotton, the first being from the pickings which take place from February to April; the cotton from these is by far the better. The second grade is that represented by the second picking, which is obtained after the summer rains in May. This second picking is generally called the "second flush;" when the first picking is finished and the plants do not look as though they would yield any more, it is usually the time when heavy thunder rains fall in Southern India, and these put new life into the plants. Within a very short time after the rains fresh bloom appears, and finally the bolls form and mature. This "second flush" gives a smaller yield, and is inferior in quality, I was assured that the grade of Cambodia all over the south of India does not vary very much; this is different from Tinnevelly, of which there exist some eight different grades.

Cambodia cotton is highly appreciated by the cotton spinners in the south of India; in the north it is hardly known yet, as the cost of transportation from the south to the north is almost as heavy as that of shipping the cotton to Europe. One spinner told me that he uses this cotton for 40's, another stated that he produced with this cotton alone a very good 30's twist, and that he improved his low Middling American with it. I have seen beautiful linings and white shirtings produced from yarn made entirely of this cotton. Some of the spinning mills in the south

have recently put up new machinery in order to use with advantage this long staple cotton. Indian cotton manufacturers have opened up a new market for fine goods, which until the discovery of Cambodia cotton they could not produce economically. One of the spinning firms had an advertisement in the Madras local papers with a view to stimulating the cultivation of this Cambodia cotton round Madras City, giving particulars of how the cotton is to be grown. The difference between the price of the ordinary local cotton and Cambodia is 1 penny per pound. Most of the Cambodia crop last year was sent to various parts of Europe.

In discussing the future of this Cambodia cotton I was told that we might in ten years' time have easily one million bales of Cambodia grown in the south of India, and these should replace an equal number of bales of American cotton. The great necessity for a rational and sound expansion of this wonderful Cambodia seems to centre, in my opinion, in the immediate establishment of seed farms, which should devote half of their land every year to growing this cotton alone. The fact that the ginning out-turn has come down from 44 to 33 per cent. is a proof of either wrong cultivation or of the mixing of the seed with other kinds. On one occasion I debated, with three experts, the question of seed farms for the exclusive purpose of growing Cambodia, and they agreed with me that the only way to improve the ginning out-turn and to keep the characteristics of Cambodia pure would be for the Government to start at once a seed farm of, say, 400 acres, and to devote every year 200 acres of it solely to the growing of pure Cambodia. The cotton crop on the seed farm would pay well for the expenditure, and would enable the Government to sell pure seed at a very cheap rate. Such a seed farm would be a paying concern from the outset, and its benefits would be: —

(*a*) The obtaining and distributing of pure seed.
(*b*) The demonstration of proper cultivation.
(*c*) A financial gain.

The farm should be situated in the vicinity of Trichinopoly, and in order to prevent self-hybridisation no other cotton should be grown on this 200 acres.

I was assured that bribes are often given when native subalterns are entrusted with the disposal of seed. Although from personal experience I can hardly credit the statement made to me by many Anglo-Indians, I think it will be well if a sharp eye on those who are engaged in the selling of the seed and produce of the Government farms is kept.

In speaking about bribery amongst the Native Government officials, I may here relate evidence which I have received not only from government officials, but also from farmers in two provinces.

The Indian Government frequently makes advances for the purpose of assisting farmers in the purchase of seed or agricultural machinery; such advances are known under the name of "Takavi." A small rate of interest is charged (6 per cent. per annum), and the money is encashed by easy instalments through the Revenue Department. There accrues hardly any loss to the Government from these advances, as the cultivators refund the loan honorably. When I spoke in the Bombay Presidency of the comparatively little use to which this "Takavi" is put by farmers, I was told that in the first instance there is so much "red tape" to be gone through that many months elapse before the loan is handed over, and that it consequently comes too late. Whilst one can understand a delay in the granting of the loans, it is unpardonable that comparatively a large amount of the advances made is paid in commissions and bribes to Native Government officials, thus mitigating the advantage of a small rate of interest. One of the commissioners, in one of the official speeches he made, deplored this state of affairs, and as the statement came from such a high official I must reluctantly accept it as correct.

A seed farm ought to possess its own gin, worked by an oil engine such as is used largely in the Central Provinces. (See remarks under Central Provinces, page 223).

[illegible]

[illegible] there is [illegible]

[illegible] expressed the opinion that the [illegible] as shown in the following [illegible] it heats the seed and con- [illegible] germinating power. [illegible] Other experts [illegible] as opposed to this view.

TINNEVELLY COTTON.

"Tinnevelly Cotton" is grown chiefly on the black cotton soil plains found in the northern parts of Tinnevelly and the southern parts of Madura, but with the produce of these tracts some of the produce of Tanjore, Trichinopoly, Coimbatore, and Salem is exported under the same name. It is one of the most highly-prized of Indian cottons and one of the few which are suitable for mixing with "American;" it commands from 1 penny to ¾ penny per pound lower price than Mid-American. It is valued chiefly for its colour, which is very white; it also excels in cleanness and freedom from leaf and in strength of fibre. The fibre is not particularly long. Tinnevelly cotton usually comes into the market in good condition, but adulteration with seed cotton, sand, and other foreign matters is practised.

WESTERNS.

The following is an abstract from a Government report: "Westerns may, according to the Madras Chamber of Commerce, be divided into 'Westerns' and 'Northerns,' the former coming from the country north of Bellary and Kurnool, the latter from those parts of Cuddapah and Kurnool lying in the Nandyal valley and some portion of Anantapur about Tadpatri. Apparently the mixing of the two classes is a source of complaint, the former being inferior to the latter, which, though not so white, is more silky. 'Westerns' proper from Kurnool, Bellary, and the Nizam's dominions is longer stapled than 'Tinnevelly,' and the colour is fairly white, but it is dull, rough, and often mixed with broken leaf and seed. Its value is about ½ penny a pound less than Tinnevelly, and it is frequently adulterated with seed, but the presence of large quantities of seed in this class of cotton is often attributable to the practice, specially adopted in the Nizam's dominions, of cleaning it by foot-rollers.

FIGURE 2.—STACKS OF SEED-COTTON IN THE YARD OF A GINNING FACTORY.

NORTHERNS.

"'Northerns' are silkier than 'Westerns,' and, were it not for the slightly red tinge they have, would be in more demand than they are. They, however, command from ¼ penny to $\frac{3}{16}$ penny per pound more than 'Westerns,' with which they are often mixed. This variation in the colour of the lint appears to be due to the nature of the soil on which the crop has been grown; that produced on 'Regada' (black cotton soil) being superior in colour and fineness, whilst that produced on the red and mixed soils is not nearly so white and is of inferior quality.

Even on the black soils different varieties produce samples of different character and value. There appears to have been a gradual improvement in the condition of the cotton brought

to market in recent years, probably owing to more careful preparation. In the localities where these cottons are grown, several experiments have been made with other varieties, viz., Broach, Bourbon, New Orleans, and Nankin. The second and last-named varieties have not succeeded. The first-named crop succeeded during the first year in which it was tried, but it appears to require a heavier rainfall than is met with in Bellary and earlier sowing than is there practised. The New Orleans variety grows freely in Kurnool, but the difficulty of separating the seed from the lint makes the ryots unwilling to grow it as a crop.

COCANADAS.

"'Cocanadas' is produced chiefly in the Kistna district, although some is also raised in the Godavari, but the latter is chiefly consumed locally. This class of cotton occupies a position in the estimation of the English market between 'Tinnevelly' and 'Westerns,' being worth about ½ penny less than the former and from ¼ penny to ½ penny more than the latter. The staple is of moderate length and strength and silky, but has a red tinge; it is valued by the manufacturers of coloured yarns, and is used also in the manufacture of lace. The redness of this class of cotton is peculiar, and the best qualities come from the Palnad taluk of the Kistna, whilst that from other localities is very varied."

GOVERNMENT SEED FARMS.

The Government has about fifty seed farms, of an average area of eight acres, distributed all over the Presidency. These farms are owned by cultivators, but the Department of Agriculture supervises the cultivation and buys the seed cotton back, gins it, and distributes the seed. A premium of four rupees per 500 pounds seed cotton is paid by the Government for cotton grown on these seed farms, but the stipulation is made that the cotton must be perfectly dry. The owners of the seed farms have to sign an agreement that the cotton is to be sold back to the Government and that they will cultivate the cotton in

drills instead of broadcast sowing, which is the general custom in the southern part of Madras Presidency. In this manner the Department of Agriculture obtains annually seed sufficient to supply 12,000 to 15,000 acres; it has opened up some seventy seed depots in various villages. These depots are a necessity because just before the sowing season journeys of long distances by road are impracticable owing to the heavy rains.

There are some agricultural associations in Madras, but so far they have not been of much practical use. The Co-operative Credit Societies are beginning to make themselves felt.

FRAUDULENT DAMPING OF COTTON.

As regards artificial damping, I was told that the farmers do not as a rule resort to this practice in the southern part, but Western cottons in the north are frequently mixed with salpetre, which takes up readily the moisture of the atmosphere.

There is no scarcity of labour in the south of India.

The wages for picking cotton are mostly paid in kind, the pickers receiving from one-sixteenth to one-quarter of the cotton picked, according to the variety.

As regards insects, there is not much cause for complaint in the south of India; besides small quantities of aphis there exist cotton insects only at Erode, where perennial cotton is grown.

NECESSITY FOR INCREASING THE STAFF.

One of the deputy directors told me that although he had already been in this district for seven years, he had not yet been able to visit all the districts which are likely to grow cotton. The particular deputy director is a most zealous and energetic man; this proves clearly the absolute necessity for an additional European deputy director for this province.

Most of the Anglo-Indians agree that, although in future years the higher posts in the Department of Agriculture might be thrown open to Indian gentlemen, still, as long as there is a great deal of pioneer work to be done, these higher

posts should be filled by Europeans with University training and practical experience in farming.

CULTIVATION.

Whilst in the northern part of the Madras Presidency all the cotton is sown in drills, in the south only broadcast sowing is resorted to. In the north several kinds of crops are planted in one field all mixed together. This is done in order that at all events some crop may be raised. One can notice, for instance, Jowari (a kind of millet) mixed with cotton, and when one approaches such a field one can at first sight only recognise the crop which stands highest, viz., Jowari. It is claimed that this method is advantageous for the farmer in districts where the rain is uncertain, as in the north. Where these mixed crops of cotton and cereals are planted there is no need for any rotation of crops, but in the south it is the custom to plant two years consecutively cereals and the next year cotton.

Manure is applied only to the cereals. In the black cotton soil district of Coimbatore no rotation of crops is practised. Thinning out in dry districts where rains are uncertain is not considered advisable, because the plants in consequence of the thinning out branch out and grow too vigorously, so much indeed that during the time of the maturing period, when the plants require a great amount of moisture, they suffer considerably, as the available moisture cannot feed the vigorous plants.

The system of fertilizing adopted by good farmers in this Presidency is to allow about a thousand sheep to graze on one acre during one night. The farmers have to pay for this about 4 rupees per night. Generally this is done only by the best farmers; the ordinary ryot does not manure his cotton soil as a rule, but considers it sufficient for cotton to receive the residue which has been applied to the preceding crop. A very interesting experiment as to the value of fertilizing was brought to my notice at the Koilpatti Government farm, where one acre, treated with cattle manure mixed with urine, produced 1,000 pounds seed cotton of Tinnevelly, against 300 pounds in unmanured ground.

FIGURE 3.—THE CAWNPORE CHAIN-PUMP.
Worked by hand, bullock, or oil engine; it is claimed that it lifts water from a 30-foot depth.

As regards the wells which are in use in many parts of India, and that are being bored in the south of Madras, I am inclined to think that they might be considerably improved. The Cawnpore chain-pump (illustration above) and some of the Egyptian water-wheels could in many cases be used with greater efficiency. Care should be taken that all machinery at the Govern-

ment agricultural farms should be kept in perfect condition, and that, for instance, the buckets used at the wells should not leak. I have seen a good many defective buckets used in connection with these draw-wells, and the accompanying illustration shows the great amount of waste of water occasioned through leakage of the bucket; the photograph was taken on a Government farm.

FIGURE 4.—A LEAKING BUCKET ON A DEMONSTRATION FARM.

LAND VALUES.

These have increased considerably in the Madras Presidency during the last few years; recently a farmer in the south paid for purely agricultural land 1,000 rupees for 3¾ acres. The annual land assessment is 2 rupees per acre. Where rice is grown a charge of 10 rupees per acre for irrigation water is levied, but where there are wells, that is, in all the districts where Cambodia is grown there is no charge for irrigation, as the wells are made by the cultivators.

CENTRAL PROVINCES AND BERAR.

I may be excused for giving detailed information as regards cotton growing in the Central Provinces, as judging from what I have seen on my visits to the various districts, I consider that the administration and the practical management of the Agricultural Department of the Central Provinces may be considered the most perfect in the whole of India. This is largely due to the expert knowledge which the Director of Agriculture, Mr. C. E. LAW, C. I. E., has obtained through his many years of service and through the able manner in which he is being assisted by his deputy directors, who are working with him in a most harmonious manner. I may here mention that the posts of Directors of Agriculture are filled from the Indian Civil Service, and that these gentlemen are intended to act principally in an administrative manner. The technical experts are the deputy directors, who have had a specialized university training in agriculture and practical experience in farming. During the last two years two of the directors have studied agriculture in England.

The Central Provinces and Berar are the second largest cotton-growing district of India, the area under cultivation being this year 4,500,000 acres. It is interesting to note that in 1868 only 2,000,000 acres were grown under cotton in this tract. The geographical position of the cotton tract is Berar, Nimar, Nagpur, Wardha, and on a small scale throughout the provinces.

The crop of the last season being much higher than the previous one, it is estimated that 320 pounds of seed cotton per acre would be a fair average, and the amount of lint is 35 per cent. The rains began on the 12th of June, and with the first break of the monsoon from three to ten inches fell. Many cultivators had sown their fields after the first break of the monsoon, but as there was an interval of three weeks before the second rains came, many young plants were damaged through the drought, and a large part of the area required replanting; therefore the crop was about three weeks later than usual.

Notwithstanding this short drought the crop has been a good one.

The kinds of cotton grown are:

KINDS OF COTTON.

Variety.	App. Staple.	Average Yield for Four Years in Pounds per Acre.			Value at this year's Prices in Nagpur C. P.	
	Inch	of Kappas (seed-cotton).	of Lint.	of Seed.	Rs.	As.
G. Malvenis	7/8	373	112	261	57	5
G. Vera	3/4	343	115	228	51	11
G. Rosea	almost 5/8	402	161	241	69	14
G. Rosea Cutchica	1/2	412	150	262	66	0
Berar Jari	5/8 (mixture different	371 of 65 varieties)	132	239	58	5
Buri (G. hirsutum)	1	303	100	203	57	15
Bani (G. indicum)	1	255	74	181	44	3

Buri is now only grown on the rich village lands and in those districts where cotton is generally affected by wilt. Buri is entirely immune from this disease. About 600,000 acres of this cotton are grown, which produce 1,500 bales. These have been bought every year by a Nagpur spinning mill.

Bani is a silky, fine cotton, of 1-inch staple, perhaps the finest cotton grown in India. It was largely exported at one time under the name of "Hinganghats," but the yield per acre is about one-quarter less than that of the local Jari, and the ginning out-turn is only 26 per cent. for Bani against 35 per cent. for Jari. Taking the yield per acre and the ginning out-turn into consideration, the advantages for the grower are considerably in favour of Jari cotton, and consequently Bani has practically been given up. The ginner fixes his value almost entirely in the ginning out-turn, and consequently the cultivator receives less money per pound of seed cotton of Bani than per pound of seed cotton of Jari.

Bani is grown mixed with Jari in the Nizam's Territory, and in small parts of the boarderland of Berar adjoining the former. There is certainly no pure Bani grown anywhere except on the Government experimental farms.

Mr. D. CLOUSTON, one of the Deputy Directors of Agriculture, writes in the "Agricultural Journal of India" about these cottons as follows: —

"It is certain that large quantities of such long-stapled cottons as Bani and Buri, which Lancashire requires, could be grown in the Central Provinces and Berar should the prices paid for the lint prove remunerative to the grower. At present they do not, except under the very special conditions to be noted later. It will be gathered from the statement below that, if we were to deal directly with Lancashire instead of disposing of the lint locally, the price realized for our short-stapled cotton, relative to that of Middling American, would be even higher than the trade pays for it here, and that to substitute a long-stapled cotton for it would, under these circumstances, prove still less remunerative for the cultivator. By exporting his cotton to Lancashire he would, under the most favourable conditions, get about 33 per cent. more for a long-stapled cotton such as Bani, than for his short-stapled Rosea; but the out-turn of lint of the latter would, on the other hand, exceed that of the former by about 117 per cent., so that, if he were to grow and export Bani at present prices, it would be a comparatively heavy loss."

Variety.	Valuation of Lint Per Pound, in December, 1910, by			Middling American.
	Manager, Empress Mills, Nagpur.	Wolstenholme and Holland Liverpool.	Gaddum & Co., Manchester.	
Rosea,	6.49d.	7d.	6.75d.	—
Malvensis,	7.42d.	8.20d.	7.75d.—8d.	
Buri,	8.67d.	7.90d.—8d.	8d.—8.25d.	8.07d.
Bani,	8.81d.	8.40d.	8d.—8.25d.	

"Rosea is a hardy variety and therefore suffers less than others from the vicissitudes of the climate and the cracking of the black cotton soil in the Central Provinces and Berar; it is the earliest, too, of all the

races grown, and its seed gives the highest germinating percentage. It is capable of great improvement in its ginning percentage by plant-to-plant selection. The selection strain which is now being propagated on the seed farms has given an average of 40.3 per cent. of lint. If it were possible to substitute rosea for the kind now grown, the higher ginning percentage alone would in a normal year result in an increase in the Central Provinces and Berar of 51,000,000 pounds of lint. The agricultural experts believe that this is possible and that to effect it merely requires time and organization, as the cultivators everywhere are clamoring for the seed.

"Rosea cutchica is slightly inferior in the quality of its staple to rosea and gives from 2 to 3 per cent. less lint.

"Malvensis and vera give about the same out-turn of lint, which is nearly equal in quality to that of bani. There is great variation in the quality and percentage of lint of different strains of malvensis, and it is therefore believed that there is much scope for this reason for its further improvement."

I inspected various fields belonging to cultivators; most of them were tolerably well tilled, all the cotton was sown in lines on the flat. In examining the cotton I found clearly six different kinds growing in one field, all mixed, rosea, rosea cutchica, vera, malvensis, bani, and Georgian cotton, *i. e.*, cotton varying from half-inch to one-inch staple and varying largely in yield and ginning out-turn. This mixture is commonly known as Berar Jari.

WATER SUPPLY.

There is no irrigation required in this district for the growing of cotton. The crop in this province depends entirely upon rain; irrigation is only required for the cultivation of rice in the north of the province, in Chhattasgarh and Chanda. In these irrigated tracts experiments are now being carried on with Cambodia and Buri cottons, and it will depend on the success of these whether an opening for these cottons will be made; there will be, owing to new irrigation works, some 2,000,000 acres at disposal. Short stapled cotton is grown in these districts on a limited scale, but with the introduction of irrigation it is antici-

pated that long stapled cotton will flourish. During the time of the American Civil War these tracts grew considerable quantities of cotton

LAND TENURE.

In the Central Provinces the villages are held by land-owners whose proprietorship is clearly recognized, though their rights of ownership are subject to the rights of occupancy of their tenants. Both proprietor and tenants are given security of tenure in the land, with the object of encouraging each to make the best possible use of it. This system has produced a number of village proprietors who often cultivate large home-farms, intelligent farmers, who are willing to test improved methods and to lay out substantial capital sums, if they are convinced that an adequate return is likely to be secured. Amongst the tenantry there is also a sprinkling of men who cultivate large holdings and employ large capital; and such men are even more numerous in the rich province of Berar, where the "ryotwari system" of tenure prevails. The difficulties in introducing improvements are, therefore, not so great as in a tract where the land is parcelled out into minute holdings and where the capital at the disposal of each holder is extremely limited, for there are numbers of cultivators ready to expend some hundreds of rupees upon a new implement, an improved method of cultivation, or the like provided they are convinced that the outlay will give a substantial return. The standard of farming attained in different parts of these provinces varies considerably, but it is on the whole [illegible] of most other parts in India, so that there [illegible] scope for improvement than in provinces where [illegible] a high level. In the Central [illegible] cultivation is [illegible] the great boom in [illegible] land with [illegible] the standard [illegible] Some cultivators

are found as exceptions among all the different castes, but the best cultivators are the hereditary cultivating castes.

In each district there is an active Agricultural Association of which the deputy-commissioner is the president. The members of these associations are the leading landholders, and a spirit of mutual respect and co-operation is being fostered by these associations. Discussions on new methods of cultivation, demonstrations, exchange of experience gained, etc., occupy the attention of the members at their meetings. It is recognized as a great honor for a man to belong to an agricultural association in the Central Provinces. These associations also promote loyalty, and are an excellent means for the Department of Agriculture to distribute the results obtained by their experiments. These associations are also organizing pig-sticking hunts, as the crops suffer considerably from wild boars. The seed farms are owned by some of the members of these agricultural associations.

SEED FARMS.

Perhaps the most important organization for the improvement of the quality in the Central Provinces is the seed farm. The Government possesses two central Government farms, from which selected seed is supplied every year; in fact, the progress of cotton growing in the Central Provinces and Berar must be attributed mainly to the excellent organization and management of these seed farms. In no other province are seed farms as numerous; forty-two farms had been established during 1911, and the number will be increased. It is anticipated that there will be some sixty seed farms in working order in 1912, but here again the limit will be reached next year, unless the Government will engage an additional European deputy director, as the seed farms cannot extend sufficiently for want of suitable supervision. It would certainly be a great pity to hamper an extension of this useful work, which is highly appreciated by the cultivators, as well as by the spinners, for the sake of some £600 to £800 salary a year, and I am told that this salary has already been provided for in the Budget. The Government agricultural farms

in the Central Provinces are now self-supporting, which is an important factor.

The method of establishing and working these seed farms is the following: Leading landholders, who are also members of the agricultural associations, were in the first instance selected by the Director of Agriculture as suitable men to look after the seed farm, and for one year or two the Government guaranteed to these men to make up any loss resulting from the introduction of the improved methods of cultivation which the Department recommended in working the farm. As a matter of fact, in no single case has a loss been sustained, and there is now a distinct demand from the cultivators themselves for the extension of this system of seed farms. At first selected seed was supplied to the owner of the farm free of cost and the Department undertook to look after the sale of seed produced; now the owners of the seed farms are paying two and one-half times the price ruling in the Bazaar for selected seed, and they themselves arrange for the sale and distribution of the seed at as much as three times the price of ordinary cotton seed. The Agricultural Department supervises only the cultivation and ginning and advertises the seed in its monthly vernacular periodical, which has a circulation of over [illegible]. The chief difficulty experienced up to now has been that of getting the seed ginned at the proper time and of preventing the mixture of various kinds during the time of ginning. At the commencement of the movement all the ginning of the seed grown on these special farms was done by hand gins [illegible] their capacity is of course very [illegible] seed cotton can be worked in one [illegible]. Several owners of seed [illegible] an oil engine and two or [illegible] not only for driving the [illegible] water, chopping cattle [illegible] the money necessary [illegible]

[illegible] these seed [illegible]

	Rupees.
"Gardner" Oil Engine of 6 horse power,	1,200
Two roller gins,	560
Cost of shed,	240
So that with a capital outlay of,	Rs. 2,000

each seed farm will be able to gin its own cotton and some of that of the neighboring farmers. On the supposition that each of these gins will be able to handle 225 pounds lint per day, and this is certainly possible, the net cost calculated will be as follows: —

	Rupees.
Interest at 6 per cent. per annum on Rs. 2,000,	120
Kerosene oil,	225
Lubricating oil,	22
Wages, engineman and four coolies,	112
Depreciation and repairs,	250
Annual working expenses,	Rs. 729

In three months the gins ought to deliver at least 47.250 pounds lint, therefore the cost of ginning works out to Rs. 4.5.0. per 280 pounds, whilst the average cost of ginning at an Akola gin is Rs. 3.8.0. (sometimes 4 rupees) per 280 pounds lint, therefore causing an apparent loss of 13 annas per 280 pounds, but if we consider that the oil engine will be used for other purposes as well and that the seed will have three times the value of the ordinary seed, it will clearly be an advantage to the owners of these seed farms to invest in these plants.

One hundred thirty-four thousand and four hundred sixty-four pounds improved cotton seed of rosea, buri, and malvensis were distributed through the twenty-two seed farms in 1910, and the number being now (1911) forty-two, about twice as much seed will have been distributed (ten pounds seed are required for one acre). As far as is practicable, entire villages are kept to one and the same strain of selected cotton. These forty-two seed farms are supplied every year with absolutely pure seed from one of the two central seed farms which are

under the direct supervision of the Deputy Director of Agriculture. I inspected one of these central seed farms for the Central Provinces and Berar, viz., that which is situated at Akola. The farm has about 245 acres under cultivation, out of these 210 are under cotton and 35 are under "Jowar," which serves principally for the feeding of cattle on the farm; at the same time selected strains of pure Jowar seed are produced. Each of the varieties of cotton contained in the Berar Jari has been carefully separated and is grown on large areas absolutely pure. When the owner of the seed farm receives seed from the central or "nucleus" farm, he gives an undertaking that he will grow the seed on the lines laid down by the Department of Agriculture, he undertakes, for instance, to manure the field, to gin the cotton raised separately, and to use it either himself or sell it to others for sowing and not for feeding or crushing purposes. The department has constantly applications for new seed by cultivators who are willing not only to pay a high price for the selected seed, but also to accept the conditions above referred to, and this is a sure sign that the work of the department is fully appreciated and that there is an undoubted improvement in quality and an increase in quantity taking place every year. The Akola Seed Farm produces twice as much cotton per acre as the average farm in the Central Provinces, and this is merely due to a more intensive cultivation carried on at the farm. In order to ensure that the seed is being kept pure a small ginnery, containing two Platts' roller gins worked by a portable 5 horse power steam engine of Marshall Sons & Co., Gainsborough, has been installed. The cost of the shed, engines and gins is about 5,000 rupees, and providing for all expenses, interest on capital and depreciation, as well as labour, the cost of ginning comes to almost 6 rupees per 280 pounds; 525 pounds lint are ginned every day during the three months season.

The whole farm, in consequence of its sound management, does not only act as a "nucleus" for the other seed farms and as a demonstration to the many farmers who visit it, but it also

realizes a very handsome profit. I cannot recommend the farm too highly as an example well worth emulation in other provinces; it certainly is the best and most effective seed and demonstration farm I have seen in India.

Modern agricultural implements are stocked by the farm and sold in fairly good numbers, the various agricultural associations acting as agents for the sale.

I strongly advise makers of agricultural implements to devote their attention to India; the opinion that the cultivators are very conservative and cannot be persuaded to adopt new methods, has to a great extent been proved a fallacy. From what I have seen of the Indian farmer, I think he is less conservative than his confrere in England. It is noteworthy to add that one large English firm of implement makers sent, last year, a practical man on an educational tour through India.

FIGURE 5.—INTERCULTIVATION IN THE SOUTH OF BOMBAY PRESIDENCY.

SOIL AND METHODS OF COTTON CULTIVATION.

The soil is a stiff loam known in India as "black cotton soil." It contains a high percentage of clay, and cracks freely in dry weather. Owing to these wide fissures, which one can notice all over the country in dry weather, it is a common saying in India that the black cotton soil ploughs itself. The cracking of the soil takes place immediately after the rains, that is, in November, and therefore quickly maturing kinds of cotton must be grown, as otherwise the roots of the plants get torn asunder owing to the cracking of the soil. For this purpose it is necessary to sow in June so that the bolls set towards the end of October. This accounts for the fact that the cotton soils in the Central Provinces are ploughed very seldom, I am told, only once in ten years with the ordinary country plough. The usual method of preparing the soil is with the blade harrow (locally known as "bakhar"); this implement consists of a knife-like blade attached to a short wooden beam, which is drawn by a bullock, the cultivator pressing the blade into the soil. Thus it may be said that the surface soil is simply scraped. It is the custom to "bakhar" the fields in this manner two or three times during the hot weather, and then again just after the first rainfall, that is, immediately before sowing. The sowing is carried on in a very primitive manner. The sowing implement consists simply of three tubes or bamboo sticks fastened by string to a wooden beam and supported by the left hand whilst the seed is dropped into the tube by the right hand of the sower. The sowing is done on the flat in very straight lines, the drills being from 15 inches to 20 inches apart; the plants are generally thinned out to a distance of 6 inches to 7 inches. It will be readily understood that in consequence of this primitive method of sowing a number of vacant spaces occur whenever the cultivator finishes the seed which he has in his hand. Sometimes the seed is held by a small cup attached to the top of the tube, and whenever this wants replenishing vacant spaces occur in the drill. Where the seed in a cotton field has not come up or where seed has not been put in through the

fault of the sower, and when it is too late to replant cotton, it is the custom to dibble into the bare places "Jowar" seed (millet).

Intercultivation by loosening the soil between the rows is carried on by a similar blade-harrow instrument closely resembling the "bakhar" already described. In this case two or three implements are worked by one pair of bullocks. Each field is intercultivated four or five times until the bolls begin to form.

Sowing begins about the third week in June and the picking begins somewhere about the third week in October. Buri, bani and other exotic kinds of cotton generally take fourteen days longer to mature; the fields are picked over every three weeks, the first picking contains a higher percentage of bolls affected by boll worm. The second and third pickings in the Central Provinces give the best lint and seed; four or five pickings are generally obtainable, the last taking place in January. It is very strange that in many other Provinces of India the first picking is the best, whilst here the second and third are decidedly superior. As early as February the cultivator begins to prepare his land for the following year's crop.

The wages paid for picking cotton are 5 annas per 40 pounds, and one woman can pick on an average 45 pounds per day. Until quite recently it was the general custom for the pickers to receive a certain quantity of the cotton picked, say one-twentieth, in lieu of wages.

On the Government farms the wages for permanent labourers are 8 rupees per month during eight months of the year and 9 rupees per month during the four harvest months. In Berar labourers often hire themselves out for the whole year, in which case they receive 70 to 80 rupees in cash at the beginning of their employment and some small portions of green crops during the year.

No strict rotation of crops is adhered to; in some cases, on the rich lands near the villages, the cultivators will grow cotton year after year without rotating with any other crop. The

following remarks on this subject by the Deputy Director of Agriculture are very interesting:—

"Rotation experiment with jari cotton as the principal crop. The plots are fertilized at the rate of 40 pounds of nitrogen per acre in the year in which the cotton is grown except in the case of plot IX. In plots III and IV there are six lines of cotton to two lines of fertilizer.

"In Berar cotton occupied 41 per cent. of the cropped area last year. There is a good deal of variation in the rotations practised.

"The cotton-wheat and cotton-gram rotations are practised to some extent in the deep black soil of the Purna valley, which is very retentive of moisture, and which therefore lends itself to the cultivation of rabi crops.

"Cotton followed by tur is very seldom practised except in the poorer parts of Morsi and the Melghat Taluks.

"Cotton cultivation continuously in the same field for a period of years, as in plot No. IX, has become a fairly common practice in Berar. This disregard of the principle of rotation in cropping is decried by scientists, who attribute to it the spread of insect pests and fungoid diseases. The results up to date, however, have not justified that assumption. The experiment has now gone on for four years; no trace of disease and no serious damage by insect pests have yet been noticed. Economically the practice has proved a sound one owing to the high price of cotton, and it is therefore being followed in the non-experimental area of the farm."

Many other highly interesting experiments are carried on by the Deputy Directors on the Government farms, the results of which are published yearly in the annual reports of the Agricultural Stations, and I would recommend the study of these to all interested in cotton growing countries. Copies of all the Government publications on Agriculture may be bought at cheap rates at the following booksellers

Messrs. [illegible], Bridge Street, Leicester Square, London, W.C.

" Area of each plot .10 of an acre.

No. of plot.	Crop in 1907-08.	Outturn per acre in 1907-08. Seed cotton or grain.	Outturn per acre in 1907-08. Fodder.	Crop in 1908-09.	Outturn per acre in 1908-09. Seed cotton or grain.	Outturn per acre in 1908-09. Fodder.	Crop in 1909-10.	Outturn per acre in 1909-10. Seed cotton or grain.	Outturn per acre in 1909-10. Fodder.	Crop in 1910-11.	Outturn per acre in 1910-11. Seed cotton or grain.	Outturn per acre in 1910-11. Fodder.	Average value of outturn for four years.
		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.	Rs. a. p.
I	Cotton	160	—	Wheat	410	670	Cotton	467	—	Wheat	520	750	34 13 9
II	Wheat	35	285	Cotton	150	—	Wheat	304	376	Cotton	293	—	22 6 8
III	Cotton	137	—	—	—	—	Cotton	215	—	—	—	—	22 11 3
	—	—	—	†Juar	220	1,300	—	—	—	†Juar	465	1,300	
	*Tur	76	70	—	—	—	*Tur	200	240	—	—	—	
IV	—	—	—	Cotton	97	—	—	—	—	Cotton	132	—	27 15 7
	†Juar	410	1,910	—	—	—	†Juar	531	2,045	—	—	—	
	—	—	—	*Tur	62	72	—	—	—	*Tur	330	260	
V	Cotton	160	—	‡Gram	340	580	Cotton	441	—	‡Gram	544	736	28 15 7
VI	‡Gram	270	300	Cotton	267	—	‡Gram	315	515	Cotton	384	—	30 10 8
VII	Cotton	182	—	*Tur	350	102	Cotton	558	—	*Tur	515	415	30 7 6
VIII	*Tur	340	415	Cotton	279	—	*Tur	345	389	Cotton	358	—	32 9 1
IX	Cotton	147	—	Cotton	277	—	Cotton	601	—	Cotton	348	—	40 0 7

*Tur = Cazanius indicus. ‡Gram = Cicer arietenum. †Juar = Millet.

[illegible] Street, Westminster, London, S. W.
[illegible]asse, Berlin.
[illegible]arte, Paris.

GINNERIES.

[illegible] mostly in the hands of native firms. The [illegible] the ordinary ginneries is 3 to 4 rupees [illegible] pressing costs rupees 2. 8. 0. per bale. I [illegible] factories in the Central Provinces; all [illegible]dition, the loose bales in the yard were [illegible] and no care was taken to prevent the [illegible] by the dust. I was specially struck [illegible] of loose cotton lying about in the yards [illegible]ywhere is waste of labour; the cotton is [illegible] stack to the gin by coolies, and when [illegible] of the gin on to a platform where sacks [illegible]ed with cotton by men who press it down [illegible]stead of automatic transporters for cotton [illegible]es at many gins in India, women carry it in [illegible] heads to the yard, a distance of about 100 [illegible]actory.

COTTON FOR THE PURPOSE OF FRAUDULENTLY INCREASING ITS WEIGHT.

[illegible] interesting thing from a spinner's point of view [illegible] one of the ginneries in Akola was the artificial [illegible] cotton. My attention to the watering of the cotton [illegible]ral Provinces and Berar had been directed by [illegible]ton ginners and spinners in different districts [illegible] India, which is proof that the fraudulent methods [illegible] and well-known. I must confess that in no other [illegible] I found such glaring frauds carried on as in [illegible]ently no secret is made of the watering, because [illegible] one of the ginners the reason why the whole of [illegible] covered with water pipes, he acknowledged at

FIGURE 6.—WATERING GINNED COTTON AT AKOLA IN ORDER TO INCREASE THE WEIGHT.

once that they were there in the first instance for the purpose of protecting the cotton against fire, and in the second for the purpose of watering it. I was told that watering in the way depicted in the two accompanying illustrations is done at almost every ginning factory in Akola. No charge is made for this watering, and the owner of one gin told me that the cotton is watered only if the owner requests them to do so. There was no hesitation shown when I asked for a demonstration of the manner in which the cotton is watered. About six coolies got a hose-pipe ready — it was almost three inches in diameter and the nozzle had an opening of about one inch diameter — several coolies mounted a heap of about 100 loose bales of ginned cotton, and the water was poured over them just as they would have done had the bales been on fire. The owner of the gin told me that it is customary to water in this manner for 20

minutes a lot of 100 bales. The cotton which had been watered on the previous night was absolutely "wringing wet," and although a certain amount of moisture will evaporate during exposure to the sun and during the process of final pressing, yet it must be evident that any spinner who receives such cotton is a heavy loser.

I have written a letter on this subject to Mr. C. E. Low, C. I. E., at Nagpur, who, besides being the Director of Agri-

FIGURE 7.—WATERING GINNED COTTON AT AKOLA IN ORDER TO INCREASE THE WEIGHT OF THE BALES.

culture, is also the Director of Industries, and I have pointed out to him that a great amount of the exceedingly fine work which he and his Agricultural Department perform, is bound to suffer through such fraudulent practices, and that this watering of cotton is just as much a criminal offence as the selling by wrong weights. I have also sent a photograph of this process of watering of cotton to the Member for Commerce and

Industry, the Hon. W. H. CLARKE, with whom I discussed the matter at Calcutta, and from correspondence I have received I can state that the question is being thoroughly investigated at present, and quite recently I have been informed that the Government has decided to stop this practice.

Some forty years ago there was in existence in the Bombay Presidency a Cotton Fraud Act, which was, however, repealed, on the instigation of the Bombay and Manchester Chambers of Commerce. From what I can gather the cause of its repeal was the charge levied on every bale by the Government. From the evidence I was able to procure, I learnt that the Act had many beneficial results. Whilst not advocating a levy per bale, I feel sure that the Government could prosecute in the case of watering such as described. It would be easy to prove the offence of watering the cotton, whilst in the case of mixing inferior with superior cottons the difficulty would be in proving the offence; but even there, owing to the number of people necessary for carrying out the mixing, the offence might be detected.

INSECT PESTS.

The boll worm does not do as much damage in the Central Provinces as in the Punjab and other parts of India. It has been found that exotic cotton tried in isolated plots in non-cotton tracts are often severely damaged by boll worm and leaf caterpillars, but when these kinds are grown on larger areas the damage is much less severe. Bhindi (Hibiscus esculantus, or lady's finger) has been tried with succes as a trap crop on the experimental farms, but it is doubtful whether it can be used with advantage by the cultivators in villages where there is little or no demand for "bhindi" as a vegetable. "Bhindi," or lady's finger, is preferred by the insects infesting the cotton plant, and as it comes into leaf before cotton, the insects collect in it; at that period the bhindi must be taken from the field and destroyed. Unless this vegetable is destroyed as soon as the insects appear, it will act as a breeding area for them.

Bhindi seed is mixed with the cotton seed in the proportion of 1 pound bhindi to 100 pounds cotton seed.

Experiments are also being made with the parasite "Rogus Lefroyi," which destroys the boll worm by making its living

FIGURE 8.—THE COTTON MARKET AT AKOLA.

place in the worm. In some Provinces these parasites have been to a certain extent successfully reared, but in others new parasites have attacked the boll worm parasite.

BUYING AGENCIES.

In view of the intimate relationship existing between the Department of Agriculture of the Central Provinces and the cotton mills, especially with Messrs. Tatas' Empress Mills, whose public-spirited and able manager is Sir BEZONJE

DADHABOI METHA, there is no need to establish a buying agency in the province; all the more as the long staple cotton which is grown at present is only 1,500 bales. When the extension of Buri or Cambodia cotton in the native states of Chhattisgarh has become an established fact it would no doubt be useful to make arrangements for the purchase of cotton on a guaranteed basis, but this will take a few years yet.

COTTON MARKETS.

It is customary for the farmers to bring their unginned cotton for sale to a cotton market. I visited the Akola Cotton Market, of which the accompanying photograph gives a good illustration; it was established some ten or twelve years ago. It is open from 7 to 11 in the morning, and from the early hours the cultivators bring the seed cotton, mostly loose, in primitive carts, to this market. For each cart a levy of 1 penny is charged by the Municipal Committee. Five members of the Town Council are appointed to act as a committee on the cotton market. Each cultivator has his own agent, who shows the samples to buyers. When the price has been agreed upon the cotton is delivered and weighed on a beam balance. The agent (adhatia) generally pays cash in the evening of the transaction to the cultivator, whilst he himself receives the money from the buyer on the following day. The commission to the "adhatia" is 1 rupee per cart. The price of the cotton is fixed almost solely on the ginning out-turn and the colour; the length of staple is generally left out of consideration. In the busy season as many as 5,200 carts of cotton change hands in one day in the Akola Market.

BOMBAY PRESIDENCY.

There are five cotton tracts in this Presidency, viz:

	Soil.	Rainfall.
1. The Surtee-Broach or South Gujarat Tract,	Black clay	inches. 33–45

2.	The Ahmedabad-Kaira or North Gujarat Tract,	Sandy	28–37
3.	The Karnatak Tract,	Black clay	23–34
4.	The Deccan Tract,		20–30
5.	The Sind Tract,	Loam	7.0

with a yearly total area under cotton of nearly 8,000,000 acres.

I. — Surtee–Broach District.

The principal towns in this district are Surat, Nausari and Broach. The general aspect of the country is that of a flat plain relieved by a scattered growth of bàbul (Acacia arabica), toddy palm (Phœnix sylvestris), and other trees.

The soil is deep black and retentive, which under a rainfall of 34 inches to 45 inches within a period of three and one-half months, can support the best indigenous cotton, which requires eight months to mature.

The cotton of this district is that well known as Surtee-Broach. It is noteworthy that the quality of the cotton produced, known commercially as "Broach," improves as we proceed south, Nausari, near the southern boundary of the tract, producing the finest staple of the growth.

The crop is sown in a two-year rotation with Jowar (Sorghum) with the first rains in the middle of June; picking takes place in February-March. The cultivators are probably the most careful in India.

In parts of certain talukas (village districts) in the north of the tract (vis., Jambusar and A'mod) a courses variety of the herbaceum species known as "Godhari" is also sown partly on light soil. This is doubtless fraudulently mixed with the finer growth. The growing of an inferior style of cotton in a area suited to and bordering on a finer growth is a matter of considerable importance when the improvement of the staple of the tract as a whole is taken up. The Indian ginner seem to be unable to resist the temptation of mixing a low quality with a superior one.

The cotton grown generally in this district is Surat "Deshi" Broach of $\frac{5}{8}$-inch stable; the yield on one acre of the Government Farm of plants raised from ordinary Bazaar seed was 498 pounds of seed cotton, with a ginning out-turn of 32.9 per cent.

METHOD OF CULTIVATION.

Instead of a plough, a scraper, as described in the previous pages, is used to loosen the soil prior to the arrival of the monsoon. Ploughing with steel ploughs is only recommended when it is a question of getting rid of the deep-rooted weeds, and then it must be done at once after the rains, the ground being heavy black soil, which it would be impossible to plough in dry weather.

Many parts of India are suffering from a deep-rooted weed called "heriali" (Cynodon dactylon). In the south of the Bombay Presidency I was very pleased to see that a plough had been obtained by the Government with the special view of assisting farmers to get rid of this deep-rooted weed, which soon spreads over the whole field. The plough in question was made by A. BAJAC, Liancourt, France, and was worked by means of two windlasses; it is designed on the system of the steam plough, a windlass is fixed on either side of the field, a cable to which is fastened the plough is wound up by one windlass and let out by the other. The windlass is turned either by two strong bullocks or four medium-sized ones. The illustration given here shows the implement. The total cost is 3,200 rupees, delivered in India, and the whole of the machinery appeared exceedingly well made. The plough moves slowly from one end of the field to the other, but does the work efficiently. One-quarter of an acre is ploughed in eight hours. I have measured the depth of a furrow, and found it to be almost 16 inches. The Agricultural Department hires this plough out to farmers at a charge of 3 rupees per day, and it is a sign of the advancement amongst the cultivators that they have readily taken up this implement. I was told that this plough is booked already for every day during

the next three years. Cultivators have been driven to the necessity of digging up their fields owing to the rapid spreading of the weed. The cost of the labor for digging up the field is calculated at 50 rupees per acre. With a Bajac plough, if they hire the bullocks, the clearing costs them 28 rupees per acre, the farmer finding the labor. The plough can be easily worked.

I consider that the Agricultural Departments or the Co-operative Credit Societies and the local boards should supply these ploughs in the various Provinces, as it cannot be expected that the farmer will invest so much money as is required. This is certainly a practical kind of work, and would cause a very large area of land in India to be made cultivable.

FIGURE 9.—PLOUGH, SUPPLIED BY A. BAJAC, LIANCOURT, FRANCE.

The plough works 15 to 16 inches deep and is driven by bullocks by means of a windlass on either side of the field, on the system of a steam plough.

SOWING.

After the first break of the monsoon, when about 4 to 5 inches of rain has fallen, the field is sown on the flat in perfectly straight

lines, 2 feet apart. A sowing drill similar to that already described is employed. The plants are thinned out to about 12 inches apart as soon as they are about 6 inches high. The soil is loosened by the intercultivator, the scraping implement as described previously. It is quite remarkable how straight the lines are sown; the hoeing by means of the intercultivator prevents the cracking of the heavy soil and thus the evaporation of moisture.

Sowing takes place in July and extends to September if necessary; 10 pounds of seed are required per acre. There is hardly any irrigated cotton in the Bombay Presidency. A great number of draw-wells exist; the cost of the one illustrated is 1,500 rupees.

FIGURE 10.—A WELL NEAR SURAT.

(Whilst the bullocks walk down the incline the bucket ascends; no water is lifted whilst the bullocks walk up the hill.)

ROTATIONS OF CROP.

Generally a two-years' rotation of crops is practiced in this district, viz., sorghum, with a mixture for tur (pigeon-pea, Cazanius indicus), which is a leguminous crop, and the following year cotton. Sorghum is used as a grain food for the people, and the stems serve as fodder for the cattle. Lately it has been found that ground-nuts are an excellent rotation crop, but there are some difficulties as regards harvesting. The jackals, which abound in India, do a great deal of harm to the ground-nuts.

INSECT PESTS.

Generally speaking, the cotton of this district is comparatively free from insects. There certainly are boll-worms, aphis, and a surface caterpillar, but none of them is serious except during the cloudy weather at the back-end of the season.

PICKING.

Women are engaged in the picking; they are able to gather about 40 pounds a day, for which they receive 3 pence. If the work is carried out by contract as much as 100 pounds can be collected, but dirt, leaves, and other impurities are mixed up with the cotton picked. Scarcity of labor is seriously felt during the picking season, although Gujarat has a population of 419 per square mile, and is one of the most thickly-populated agricultural districts in India.

MODE OF SELLING CROP.

It is customary for dallals (small merchants) to personally visit the villages for the purpose of collecting the cotton. Cultivators who are in need of money receive advances from them. Any verbal agreement, unless supported by token, is not regarded as binding.

GINNERIES.

There are more ginning factories in the district than are really wanted, and the various firms have now amalgamated, closed

some of the old gins, and the profits of all are pooled and then divided. Only a few of the gins at Surat possess steam presses; in many cases the loose bales of ginned cotton have to be sent by rail to the steam press. I was told that it does not pay to have a steam press in connection with a ginning factory unless 5,000 bales are turned out per season. The charge for ginning is rupees 4. 8. 0. per bhar of 916 pounds; the seed belongs to the cultivator. There is practically no hand ginning done in the Bombay Presidency.

BOMBAY MILLOWNERS' BUYING AGENCY.

The Bombay millowners have established a buying agency in Surat to stimulate the growing of an improved Broach cotton. They have not considered it advisable to erect their own ginnery, but have found it more advantageous to hire one of the existing gins. The accompanying photograph of this ginnery was taken some time before the season started, and shows the place perhaps to a disadvantage. All the gins in this ginnery are somewhat old but still in working condition. The ginneries in this district work generally from February to the beginning of April, and one factory with thirty gins last season turned out about 4,000 bhars of 916 pounds of seed cotton equal to about 3,000 bales lint. The owner of the ginning factory which attends to the cotton of the Bombay Millowners' Buying Agency has given an undertaking that the seed will be kept perfectly separate. The drawback with the working of this gin seems to me to be the long distance which in some cases separate it from the cotton fields where this special cotton is grown. The half-pressed bales of this ginning factory have to be sent by train to Broach in order to be steam-pressed there. This means an additional expense of 2 rupees per bale, viz., 1 rupee for carriage and 1 rupee for pressing. During this season 2,300 bales of the improved cotton will be produced, and it is anticipated that next season, if the farmers are satisfied with the price obtained, 20,000 bales will be grown. In this case an up-to-date ginnery will be hired for about eight weeks. The Bombay millowners have guaranteed

the farmers 5 per cent. above the price of the ordinary local cotton for the improved Broach, and, unfortunately for the spinners, as the difference in price between American and East India cotton has this season been very slight, they are likely to lose on the transaction.

The ginning factories are to a large extent in the hands of financially substantial people, and many of the Bombay traders are interested in them.

LAND TENURE.

Practically speaking, there are only small landowners in Gujarat who hold 20 acres and possess on an average two pairs of cattle. The yearly assessment for the best cotton soil is about seven rupees. This system is more or less that of a leasehold with an annual chief rent of seven rupees. The farmers may sublet the land, in which case rents as high as 17

FIGURE 11.—THE GINNERY AT SURAT.
At which the Cotton for the Bombay Millowner's Buying Agency is Ginned.

rupees are obtained. Most of the cultivators have borrowed money at a high rate of interest (16 to 20 per cent.), but the loans received are not very large. I was told that about 15 per cent. of the farmers who grew the improved Broach cotton required advances from the Bombay millowners before the crops were matured.

There is no agricultural bank in the district, but Co-operative Credit Societies have been started. Since 1903 their number in the whole Bombay Province has increased to 350, and they are likely to make steady progress. The Co-operative Credit Societies have no central fund, but a central land bank has been established recently in Bombay for the purpose of financing Co-operative Credit Societies in the sugar cane tract. This central land bank is a private concern, guaranteed by the Government. It lends to Co-operative Societies at 7 per cent. per annum, and the farmer receives the loan from the latter at 9 per cent. per annum.

WAGES.

The wages have already risen and, owing to the scarcity of labour which is making itself felt, there is likely to be a further advance. At present the wages are: Men four pence, women three pence, children two pence per day of eight hours.

EXTENSION OF COTTON AREA.

There is no further area in this district — in fact, hardly any in the whole of the Bombay Presidency — which might be put under cotton. It seems, therefore, that as regards the area the Bombay Presidency has reached its limit, but the yield could be materially increased by:—

(1) Clearing the land thoroughly of the deep-rooted weeds, as described previously.

(2) By seed selection, inferior types must be removed by separating the best strains and selecting within the latter. There is a much larger staff required for seed distribution. I am convinced that if the seed farm system of the Central Provinces was introduced into Gujarat some considerable prog-

ress would be achieved, as the people of the district are very intelligent.

(3) Better rotation of crops, if necessary three years' rotation, say, cotton, sorghum and sesamen (oil seed).

(4) Manuring more judiciously.

In the native State of Kathiawar twelve years ago a nice cotton known by the trade name of "Dhollera," was grown. This has now been replaced by a very inferior cotton called "Mathio," which is a high yielder and early maturing.

SURAT GOVERNMENT FARM.

I paid a visit to this farm, which has 315 acres, 165 of which are arable, the remainder being pasture. The farm is well managed.

A great many improved strains of cotton have been raised, but special attention is now given to the following three:

(1) Selected Surat.
(2) Hybrid 1018.
(3) Hybrid 1027.

These cottons have yielded well, and their ginning percentage is also satisfactory. On land in good condition selected Surat gave an out-turn of 692 pounds seed cotton, with a ginning percentage of 32.2. The Hybrid 1027 yielded at the rate of 575 pounds, with a ginning out-turn of 33.8 per cent., and Hybrid 1018 yielded 546 pounds, with a ginning out-turn of 34.6 per cent. The following valuations of large samples by Lancashire spinners may be of interest:

Name of Variety.	*Valuations by One Firm on 23rd September.	†Valuations of Another Firm on October 26.
Selected Surat	Fully good to fine Broach. Price 7 pence.	7¾ pence
1018 P–G	Beautiful Staple, could easily be spun to 20s. twist, 26s. weft. Price 6½ pence.	7½ pence
1027-A., L. & F.	Could be used for weft, would spin up to 22–24. If mixed with American cotton could be spun up to 30s. Price 6⅞ pence for "spot."	7¼ pence

*Middling American was quoted at 7.61 pence per pound on 30th September in Liverpool.

†Middling American quotation on October 26th was 7.88 and that of fine Broach 7½ pence in Liverpool.

Last year some 3,000 acres were sown with these cottons by cultivators in the neighborhood of the Government Farm, and the Department organized a sale by auction of the seed cotton. The seed which has been produced on the Government Farm is now known in the Bazaar as "farm cotton," which is an important factor.

It is not astonishing that the farmers who have grown small quantities of these new hybrids have not yet been able to obtain a fair price for their produce. A buyer has no special use for, say, 20 pounds superior cotton when he is purchasing at the same time 400 pounds of ordinary cotton from the same farmer. The cost of collecting the many small lots of this higher-grade cotton must be very heavy, and I am inclined to think that the Department has made a mistake in persuading the cultivators to grow these new strains before sufficient seed was obtainable to produce a fair marketable quantity. It also seems to me that experiments are carried on with too many varieties, and I think it would be more judicious for the Agricultural Department to concentrate its attention on one or two kinds and hand the seed of these over to the cultivators, after their suitability has been established beyond doubt, and after a sufficient quantity of seed is available to produce, say, a few thousand bales of each. In this way a natural demand would spring up, and the supply would not require to be "nursed" by a guarantee from a buying agency.

II. — Ahmedabad-kaira or North Gujarat District.

This tract, comprising the two districts indicated by its name, together with the northern part of the Broach district, is somewhat remarkable in that it grows within a narrow area a number of types in a more or less mixed condition. This is due partly to the black soil occurring in patches and partly to the use of well irrigation. The average rainfall is 30 inches. The four chief types of cotton are known to cultivators as Wagad, Lalia, Goghari, and Rozi. Commercially they are grouped under the

common name of "Dhollera." The growth is largely consumed locally in the mills of Ahmedabad.

Wagad is a variety of herbaceum differing from the Broach outwardly only in size. The peculiarity with regard to this cotton is that the bolls are bodily plucked from the plants, and the seed cotton is extracted at leisure in the houses of the cultivators. The cotton is of a fair quality, coarser than Lalia, but owing to the primitive method of harvesting, Wagad contains more dirt and other impurities.

Lalia is identical with Broach, and under well-irrigation yields a similar cotton. This kind and the previous one are frequently mixed together.

Goghari is grown unirrigated under the same conditions as unirrigated Lalia. It produces a coarser fibre, but yields better on a short rainfall.

Rozi is a perennial, and once sown is left on the land for three or four years. Generally there is a mixed crop (Cereals) on the same field. The ginning out-turn is only 25 per cent., and the quality of the cotton is also inferior.

The yield per acre in this district varies from 200 pounds seed cotton when unirrigated to as much as 1,200 pounds when irrigated.

The Government farm in this district is situated at Nadiad, but not much attention is given to cotton. Experiments with perennial cotton are still continued there. These require water in the first year to get established; in the second year the trees have given 1,000 pounds seed cotton per acre, yielding about 300 pounds lint, but the third year the yield goes down to 600 pounds. The deputy director estimates that 2,000 bales of cotton of the perennial kind might be produced in this district. The staple is long, but, as far as I remember, it is very irregular. As I have pointed out in my first report, I cannot see the advisability of growing these perennial cottons, because they harbour insect pests in the bark, and the branches are so brittle that they get easily damaged by the wind. Many experts have again given me their opinion that tree cotton should be given up everywhere in India.

III. — The Deccan Tract.

The soil is a black clay, and the rainfall about forty inches in the east and twenty inches in the west. It is adjoining Berar in the east. The northern part is called Kandesh; it produces a Neglectum mixture consisting of five varieties. In the east 1,000,000 acres are under cotton, in the west about 500,000. All cotton grown here is of an inferior kind, and the Government has endeavored to separate the different varieties, and to select those with the highest ginning out-turn.

Four hundred pounds seed cotton is a good average yield.

Assessment is rupees 1. 8. 0. to 2 rupees per acre; when land is rented 12 rupees are paid.

Most of the tenants own from 5 to 25 acres, but there are some farms as large as 100 acres.

The prepondering variety of cotton is Rosea, with a staple of ⅜ inch to ½ inch. Its colour is very bright and white.

South of this district is Deccan proper. Although cotton here is planted on a somewhat extensive scale, it cannot be considered a lucrative crop. I did not visit this district, but was told that the Government is giving more attention to the cultivation of sugar cane than of cotton. Some increased area should be put under cotton as soon as the irrigation canals, under construction at present, are finished, and it is hoped that the Agricultural Department will then devote more attention to cotton.

IV. — The Karnatak Tract.

KINDS OF COTTON.

The important places in this tract are Dharwar, Gadag, Hubli. The soil in the western district is red, and rice is the staple crop; very little cotton is grown there. The black soil tract is east of the railway, known as black cotton soil under the name of "Desh." Here the staple crops are cotton, jowar, and wheat; 500,000 to 600,000 acres are under cotton, of which about 200,000 acres produced Dharwar-American cotton. This

has a 5/8-inch to 3/4-inch staple, a nice colour, and a ginning out-turn of 30 per cent.; its yield is 200 pounds seed cotton in the east and 300 pounds in the west. The other kind of cotton is grown in Kumpta; its staple is 3/4 inch to 7/8 inch; it has a dull fibre, but the quality is possibly somewhat finer than Broach, of which it is an offspring. Unfortunately, the ginning out-turn is only 27 per cent.; it yields 300 to 400 pounds per acre. It is estimated that 29,000 bales of Dharwar-American and 60,000 bales of Kumpta will be picked early this year. It is interesting to note that, whilst these yields are very low, the Government farms at Dharwar and Gadag have produced as much as 900 pounds seed cotton. The Agricultural Department is pushing Broach in the most favoured parts of the Kumpta tract, because it has a higher ginning percentage, viz., 33 per cent., and is better in colour. Broach must be sown in the Karnatak district with the early rains. The staple of the cotton shown to me was 7/8 inch, and the fibre was a pure white. Dharwar-American had only a 5/8-inch staple, and is not very strong. The department is replacing it by Cambodia in the dry districts. Broach and Cambodia can naturally be picked cleaner, as the bolls are more open and are larger than those of Dharwar cotton. The Government Department has raised the ginning out-turn of Broach in this district to 34 per cent., and at the auction sale the Broach cotton of this district was sold at 220 rupees per naga of 1,344 pounds seed cotton, whilst Kumpta on the same day was bought at 150 to 154 rupees per naga. During the last three years auction sales were held by the Agricultural Department for the disposal of this improved cotton in order to secure fair value. The whole of the produce was sold last year to two Indian millowners, and on an average fetched 12 per cent. above the price of Kumpta. One thousand acres were under Broach cotton in the Karnatak Tract during 1910-11 season, and produced 170 nagas.

There is no organization for seed distribution in existence on anything like the lines of those successfully adopted in the Central Provinces. The Broach seed used for distribution is

obtained in the Gujarat district (north of Bombay Presidency) from selected fields. There is no seed farm for pure Kumpta cotton, except a small area on the Dharwar farm.

I have no faith in rearing seed from selected fields belonging to the farmers. When the Deputy Director of Agriculture and I visited a Cambodia field near Hubli, it was demonstrated to us that the system of buying seed from the farmer, although the field may be considered pure, is a mistaken one. We saw in a field for which the seed had been supplied by the Agricultural Department that Dharwar-American and Kumpta cotton were growing mixed with the Cambodia cotton. Within an area of 20 square yards, we could clearly distinguish about twelve plants of Dharwar or Kumpta cotton amongst the Cambodia. Seed farms must be under constant Government inspection. I have tried to persuade the deputy director as well as the director to establish a few "nucleus" seed farms and a number of small seed farms in the whole of the Bombay Presidency. It must always be remembered that these are no expense to the Government, and that they ensure, not only a supply of pure seed, but act at the same time as demonstration farms.

Land is held on the Ryotwari system. More than half the land is owned in areas of 5 to 25 acres. Some owners sublet it at a higher price than the assessment, which is only rupees 2. 8. 0. to 3. 0. 0. It is anticipated that the new assessment which will shortly come into force will be about 33 per cent. higher.

One farmer told me that he holds 13 acres of land which he has on a ten years' lease for an annual payment of 51 rupees, the landowner paying the assessment on the condition that the tenant would clear the land of the deep-rooted weed. If the land had been cleared of the weed the cultivator would have had to pay 250 rupees for the 13 acres. The tax on the land in question was three rupees per acre.

The farmers are not so intelligent and careful as those in Gujarat, but in the Karnatak Tract they are better than those

in the Deccan. Only a few agricultural associations are in existence, but the Co-operative Credit Societies seem to make progress.

PREPARATION.

Cotton is usually preceded by Jowar (Millet). The stubble of the Jowar is broken up by a harrow in hot weather. A good cultivator will give the land a light ploughing about four inches deep with the country plough. This takes place about the middle of June, that is, at the beginning of the monsoon. Cotton receives only the residue of manure from the preceding Jowar crop. After ploughing, one or two harrowings with the bakha are given. Cotton is sown in August with the primitive sowing drill already described. Many blanks are left in the drills; 7 to 8 pounds of cotton seed are used for one acre, and it is customary in this district to mix with the seed, castor cold weather jowar, line seed, etc., in very small quantities. No thinning-out takes place; the drills are 18 inches apart, and

FIGURE 12.—PLOUGHING IN INDIA.
(Notice the stone on the plough to increase the pressure.)

the soil is loosened by the intercultivator. The weeds are removed from between the plants after the first intercultivation. In case of a slight rain at the beginning of November, a light ploughing is applied instead of the last intercultivation. The flowers begin to show about the middle of January, and then the field is left entirely alone until the picking season, which begins in March and lasts until the middle of April. There are about four pickings, the first and second being the best. Picking wages are paid in kind.. The pickers receive one-eighth to one-twelfth for the first three pickings, and one-fourth of the last picking. The picking is carried out most carelessly, and often the cotton is allowed to shed. It is a great mistake to pay the pickers in kind, because the cotton which the pickers receive, is afterwards taken to the petty merchant in the village, who mixes all the different kinds together in his store. I was told that it is the general practice for the small grower in this district to moisten the canvas in which he packs his cotton, and that frequently water is poured over the bale before it is sent to the market. My informant also told me that water is added after ginning, especially in the Barsi district.

There is no extension of area likely in the Dharwar district, but the yield can be materially improved by good cultivation and selected seed.

Insects have not caused great damage, although in the Dharwar district the boll-worm makes itself occasionally felt.

Hubli has a cotton market similar to Akola in the Central Provinces. The brokers (Dallals) sell the cotton for the cultivator, charging him 1 rupee 4 annas per naga of 1,344 pounds, and the buyer 12 annas. When the broker makes an advance to the cultivator he charges from 9 to 15 per cent. interest.

I may mention that the Japanese millowners have a buying agency in this district.

GINNERIES.

The ginneries are in the hands of local people. The charge is 5 to 7 rupees per 336 pounds lint for ginning, including loose

baling and canvas. I was assured that watering at the gin is done in Barsi, just the same as in Akola, Central Provinces. The steam presses for export bales at Hubli, Gadag, and Dharwar charge 3 rupees to 4 rupees per bale of about 382 pounds to 400 pounds. The price of seed at the time of my inquiry was 40 pounds for 1 rupee. The ginners in this district do not as a rule buy cotton; there are a few merchants who also own ginning factories where they gin their own cotton. There is an abundance of gins, and in case a buying agency were to be established at some time in this district there would be no difficulty in hiring a gin for the whole season.

MIXING OF COTTON.

It is a common practice for the cultivators to mix Broach with Kumpta cotton, and the ginners mix Dharwar-American and Kumpta in order to get a good colour and consequently more profit. It is also the custom to bring inferior cotton from the Deccan district to be ginned at Hubli and Gadag, where it is mixed with Kumpta. I have been assured on good authority that even waste (fly) for mixing purposes is brought by merchants from the Bombay and Ahmedabad mills to the Hubli ginning factories. For the purpose of better mixing the waste is passed through an opener, together with seed cotton.

PROFIT ON COTTON GROWING.

In conversation with an educated cultivator I gathered that he made 15 rupees per acre profit on his cotton. He estimated the cost of cultivation, seed, bullocks at 13 rupees, rent 12 rupees = 25 rupees per acre, the average crop being 400 pounds seed cotton, which at the present price is sold for 40 rupees, therefore a profit of 15 rupees per acre.

SMALL GINNERY AT DHARWAR.

The following details which I obtained from the owner of a small gin depicted in the accompanying photograph may be of interest:—

A 16 horse power oil engine works four double roller gins. The oil engine uses three pounds of oil every three hours, and works twelve hours per day during three and one-half to four months in the year. The capacity of each double gin is about 800 pounds lint per day. The repairs on the whole plant come to 240 rupees per season. He charges for 336 pounds lint (resulting from a "naga" of 1,344 pounds seed cotton) 5 rupees, including loose baling, packing, and weighing. The loose bales weigh 166 pounds. The net profit during the last season, when 500 "nagas" were ginned altogether, came to 1,500 rupees. The total cost of the primitive ginning factory was 6,500 rupees, and an annual rent for the land of 60 rupees is charged. The owner works the oil engine, employs sixteen to eighteen women, who receive 4 pence per day, and two men, with a wage of 6 pence per day. Cotton is only ginned on commission. The owner does not buy or speculate in cotton.

FIGURE 13.—SMALL GINNERY AT DHARWAB.
Cost of Oil Engine (16 H.P.), Four Gins and Building, about £433= Rs. 6,500.
800 lbs. of Lint Cotton are ginned daily in the season.

DHARWAR GOVERNMENT FARM.

On the Dharwar Government farm, which is well managed, the following Indian cottons are grown experimentally. They are fairly representative of the whole of India: —

Rozi (G. obtusiflorum).— A perennial cotton, grown in rows of 5 feet apart, with cereal crop in between. The plant is pruned back to the soil every year. It has a harsh inferior fibre, and is grown in the north of Gujarat on light soil. Only very small quantities are produced, ⅝-inch staple. White.

Nadam.— Botanically same as Rozi; grown in Madras on light soil.

Deo Kapas (G. arboreum).— This is a tree that is usually grown near temples. The cotton from it is used for spinning sacred thread.

Kumpta.— G. herbaceum, grown in Dharwar.

Broach. — G. herbaceum, grown in Broach, and latterly in Dharwar.

Ghogari.— Noted for high ginning out-turn, is of a bright white color, but its staple is shorter than that of Broach, grown in north of Broach district.

Wagad (G. herbaceum).— An annual grown in Ahmedabad and parts of Kathiawar; it is hardy and stands the frost. Bolls are collected in the field and taken to the houses, where the cotton is picked.

Bani (G. indicum).—Grown in Hinganghat, Central Province; an annual; fine beautiful fibre, full inch, but possessing only 27 per cent. ginning out-turn and a small yield per acre. It has a special soapy feel.

Jari (G. neglectum).— Grown in Central Province, Kandesh, Deccan, United Provinces. This neglectum variety is the most widely distributed cotton over India.

Mathio (G. neglectum).— Grown in Kathiawar, and has been substituted for that formerly well-known Dhollerah cotton. It is very poor, but has a high ginning out-turn and matures early.

Warhadi (G. neglectum roseum) has a high ginning out-turn and yield per acre, is early maturing, ⅜-inch fibre, coarse, very

bright, liked for export, grown in Central Province, and Kandesh.

Comilla (G. cernuum).— Grown in Assam on Kil Hill, Garrow Hill. Very large ginning out-turn, 50 to 51 per cent., poor staple and coarse.

Kumpta (G. herbaceum).— South Maratha; good fibre and good staple, ¾-inch to ⅞-inch, strong, but dull. Low ginning out-turn, 27 to 29 per cent., fair yielder. This cotton is being replaced by the Agricultural Department with Broach. A great deal of dirt is always in the picked cotton.

On the Dharwar farm a 6½ horse power Blackstone oil engine is kept. It is portable, and can be moved by one bullock. Its price was 1,600 rupees loco-Dharwar. The oil engine is principally used for driving a pump that lifts water from a depth of 30 feet. During the ginning season this engine works a few small roller-gins on the farm, which turn out 34 pounds lint in one hour. The oil consumption of the engine is 1¾ pounds per hour.

The Dharwar farm has 130 acres, seventy of which are under cotton. It is an experimental farm for selection and hybridizing and making manurial, tillage, and rotation experiments. I was told that the Government does not aim to make it self-supporting, which is, I think, an error, and if proper seed farms were added, I am convinced the whole undertaking might be made self-supporting, as is the case in the Central Provinces.

SAW-GINS VERSUS ROLLER-GINS.

At Hubli I inspected a few ginning factories which had both saw and roller-gins. American cotton adheres firmer to the seed, and therefore saw ginning is considered necessary by the ginners of this district. Roller-gins remove linters as well from the seed, and it is necessary to run the rollers more slowly when ginning American cotton than when ginning Indian cotton. The saw-gins which I inspected were made by the Eagle Gin Company, Bridgewater, Mass. The shaft had twenty-four saws only, a fan blew the ginned cotton into an adjoining

room, where it was collected and packed into loose bales. I had one and the same kind of cotton ginned by a roller-gin and a saw-gin. Certainly the saw-gin process turned out a much cleaner cotton. Hardly any impurities were left in it, whilst the roller-gin did not remove many of the impurities, such as parts of capsules, leaves, etc., but the staple of the cotton ginned by the roller-gin seemed to me considerably stronger. The Eagle saw-gin turns out about 30 per cent. more cotton than a roller-gin. I was told that all the Dharwar-American cotton is ginned by saw-gins, and that formerly Macarthy roller-gins had been in use, but owing to their low ginning capacity they had been entirely superseded by the Eagle gins. The cost of an Eagle saw-gin, with twenty-four saws on a shaft, placed at Hubli, is 350 rupees. Each gin requires one horse power. The cost of the double roller-gin placed at Hubli is 450 rupees. The price of ginning is 8 pence per 28 pounds of lint (28 pounds are here called a maund), for Kumpta cotton on the double roller-gin, and 5¼ pence per 28 pounds lint for Dharwar-American on a saw-gin.

The wages are 4½ pence per ten hours for women at the gin and 6 pence per ten hours for men for heavier work. At the height of the season 6 pence and 9 pence respectively are paid.

A native gentleman who showed me round various ginning factories told me that he could well remember Dharwar cotton being picked quite clean some twenty to thirty years ago, but owing to the fact that the wages are now paid on the quantity picked, the natives have become careless, and aim solely at a large weight.

One roller in a gin will last one season (about one hundred days). When the grooves are made by hand they need not again be touched for four days, but when they are made by machinery they must be renewed once per day.

The bale presses are quite modern and up to date. Steam pressing at Hubli is charged at four rupees per bale. Usually the bale is pressed twice, first into what is called half-bales and then by the finishing press into export bales. I saw no water-

ing done before pressing. The press turned out about 150 bales per day, the charge of four rupees per bale is inclusive of pressing, canvas, and hoops.

In order to remove more dust and impurities from ginned cotton, it is customary in this district to shake and beat it on a frame which is covered by a lattice work made of iron hoops. I have never seen cotton that was so freely mixed in the picking with dirt and impurities as in this locality. In one of the presses I saw a number of women mixing two different qualities of cotton by throwing the cotton into the air. It is here where waste cotton from the spinning mills is mixed with the seed cotton for the purpose of deceiving the spinners abroad.

Cotton is usually picked towards the end of February. Owing to the drought it is anticipated that the crop will only this year be 17 per cent. of the usual quantity.

GADAG GOVERNMENT FARM.

A very interesting demonstration in favour of ploughing for districts where the rain is uncertain, was shown at the Gadag Government Farm. There was side by side a field prepared by the usual native scraper, and another ploughed with a steel plough to about five inches deep. Both fields were planted with Cambodia cotton, and the difference in crop in favour of the ploughed field was most marked. The superintendent of the farm thought it would yield 60 per cent. more than the field which had only been scraped. The preparation of the good field was one ploughing in May before the rains and thirteen harrowings and one rolling afterwards; the intercultivator was used five times. The other field had been scraped five times in October, and received three intercultivations. Cambodia is making good headway all along this district, and the farmers confirm that Cambodia is a much better paying crop than Dharwar-American, which has been established here for many years. The yield of Cambodia is, however, small in comparison with that in Madras, viz., only 400 pounds seed cotton per acre, but Dharwar-American yields only 200 pounds seed cotton.

The ginning out-turns for the two kinds were 38 per cent. Cambodia, and 29 per cent. Dharwar-American. The price of Cambodia cotton in this district last year was 205 rupees per 1,344 pounds seed cotton, whilst that of Dharwar-American was only 175 rupees for the same weight. In spite of the drought, Cambodia has done better than the Dharwar-American cotton.

HULKATI.

Some six miles from Gadag is situated a village called Hulkati. The cultivators of this village are growing nothing but Cambodia cotton, and they have recently bought an oil engine, and now gin their cotton themselves in order to keep their seed pure. These cultivators are extremely careful and intelligent. They recognize the advisability of proper treatment of the seed, and as there seems to exist the spirit of co-operation, proved by the purchase of the oil engine and gins, they should, in my opinion, receive some assistance from the Government. These people would undoubtedly respond quickly to any suggestion of improvements.

Five thousand pounds Cambodia seed were sold last year, and 500 acres were sown with it. The seed was from plants raised in the district, and should be acclimatized.

BUYING AGENCY.

The deputy director is anxious that a buying agency for Cambodia cotton should be established in the district of Gadag. I told him that the first step towards such a buying agency would be for the Government to establish seed farms, and that in view of the great demand for Cambodia cotton existing in the Madras Presidency, there should be no necessity for artificially stimulating the growth of Cambodia in Gadag, which is situated almost on the border of the Madras Presidency.

V.—SIND.

The Province of Sind is in appearance very like Egypt, and its fertile soil has been created in a somewhat similar manner

to that of the Egyptian Delta. The Indus river has been depositing silt during many thousands of years in this part of India, principally by inundations and by frequent changes of its course; even during the last few years this great river has altered its bed considerably. Sind is almost rainless, and the cultivator is therefore entirely dependent upon irrigation canals. Unfortunately the Sind canal system has not been constructed with a view to the extension of the agricultural area that has already taken place, and could still be continued. Briefly, the canals of Sind may be divided into two classes, viz., inundating and perennial. On canals of the latter kind, providing water all the year round, it has been proved that Egyptian and American cotton of qualities only slightly inferior to those of their countries of origin can be grown, and will yield as much seed cotton as the local variety.

On the inundation canals, on the other hand, water is available only during the period of inundation of the Indus. This is about three and one-half months (June to October), that is about the same as the period during which rain falls in the Presidency proper. The local variety of cotton all over Sind, except in the Upper Sind Frontier, is identical with that described previously under the name Jari, which here, however, under the influence of irrigation, yields five to ten times as much per acre. It might be argued that, even under the inundation canals, since the quantity of water available is at least equal to that falling as rain in the Surtee Broach tract, the superior cotton of the latter tract might be grown in place of the inferior Jari. Here, however, the question of temperature comes in, and where the cotton cannot be sown before June, it is necessary to grow an early ripening variety, because frost generally occurs in January. Jari ripens in five months and Broach in eight, and it is, therefore, uncertain whether Broach would mature on inundation canals in Sind.

ROHRI CANAL AND SUKKUR BARRAGE.

For the last fifty years various irrigation schemes for this district have been proposed for the purpose of increasing the

cultivable area of this fertile plain, and just now a very large and complicated project for the construction of a canal from Rohri to Hyderabad and a barrage at Sukkur is under examination by the Inspector General of Irrigation. The cotton industry would be well advised to see that this or another scheme is carried out in the near future, as through it a considerably increased area for cotton cultivation will be thrown open. When the barrage at Sukkur and the canals are constructed, which is such a gigantic work that it would take about ten years, all the land in Sind, except the desert and part of the alluvial sand in the south, will have a perennial supply of water.

The perennial Jamrao Canal feeds 700,000 acres with water, and the Sukkur project would supply 2,700,000 acres. The Indus river contains ample water to supply all the proposed irrigation schemes.

Sind has altogether an area of 30,000,000 acres, half of which is unsuitable for irrigation and half is an alluvial soil like the Mississippi and Nile Deltas. The population of Sind is only 3,500,000, but experience has proved that generally a large influx of people takes place as soon as irrigation works have been completed, and, therefore, the present scarcity of population need not cause any great anxiety.

Unfortunately, the natives of Sind are careless in their methods of cultivation.

The land is owned almost exclusively by "Jogidars," landowners who have received their possessions for services rendered to the Government, and they pay now merely an annual land occupation tax of about one rupee per acre. "Zemindars" (large landowners) pay an annual assessment of from two to four rupees, inclusive of water supply.

Agriculture in Sind is at present dependent on the following means of water supply:—

1. Rain, falling over an area of 10,000,000 acres, mostly desert land, of which only a small proportion is cultivated.

2. Kharif (hot weather). Rice flow, that is, plenty of water obtainable from river (Indus) and canals for rice cultivation.

3. Kharif Lift. Water must be lifted by instruments, such as the Persian wheels. This land is suitable for cotton.

4. Jamrao Canal. This is a perennial canal irrigating land, suitable for cotton.

5. Bosi. Land flooded once or twice during hot weather and cropped during cold weather. Cotton could be grown on the land.

6. Kucha. Flooded silt land, alluvial soil, no cotton at present.

FALLOW LAND.

The striking feature of Sind agriculture is that the native cultivates only one-third or one-fourth, or even one-fifth of the land he possesses in one year. The remainder is allowed to lie fallow; fields are left entirely untouched for years, and on riding through the district one sees much more fallow than cultivated land. Whilst these fields lie idle all kinds of bushes grow. The

FIGURE 14.—A FALLOW COTTON FIELD IN SIND.

(Notice the dried-up cotton sticks and the small shrubs.—Only once in three or even five years is a field cultivated.)

cotton sticks are left standing for years, and I am convinced they harbour insects. I saw a great number of white ants in these fallow fields. The Government does not allow the land to lie idle longer than five years, and if the fields are then not cultivated the assessment is charged also on the non-cultivated land, and if not paid the land is taken away. In Egypt a decree exists, according to which, by December 31st in each year, all the roots and cotton sticks must be pulled up and taken from the fields, as it has been proved that insects increase if the sticks are left in the field.

In view of this custom of allowing the fields to lie idle for so long a time, the Jamrao Canal was constructed to supply sufficient water only for one-third of the available land. The supply is not sufficient to irrigate all the rich lands, and it is only by the construction of the Rhori Canal that the whole area can be put under cultivation.

Labor is generally provided by the tenants' family, but in case of help being required no actual money is paid. The pickers receive one-tenth of the cotton they have gathered in lieu of wages.

The yield of Sind cotton in the fields of the ordinary cultivator is from 4 to 5 maunds of 81 pounds seed cotton per acre, about 31 to 34 per cent. being fibre.

Rotations of crop are not practised in Sind in connection with cotton. As it is the custom after a cotton crop to leave the land fallow for a number of years, it is not considered necessary to rotate the crops. It would be very much to the advantage of the cultivator to grow pulse crops instead of leaving the land bare, as rotations are the most powerful means of improving the soil.

AGRICULTURAL IMPLEMENTS.

The implements used in general practice are the plough, leveller, and a log of wood for pressing in the seed and breaking the clods. For irrigation land it is essential that its surface should be level. It is a source of great waste of water when the land is uneven. It also tends to accumulate the salt at one end

of the field. It is important to have the division plots small, not over one acre, but better half an acre, and on no account should the water from one division be allowed to flow in the next. At the Government farm at Mirpukhas an improved one-handed wooden plough and a leveller (Cassabiah) are being made and sold at cost price, viz., 5 and 7 rupees respectively. The original Sindhi plough has only a small wooden peg, which enters the soil and scrapes it rather than ploughs it.

METHOD OF CULTIVATION.

The method of sowing after irrigation is simply by scattering seed broadcast, then ploughing it in and running the wooden log over. Sowing the seed in straight lines is not said to be possible in Sind. In the cultivation and preparation of the land the chief things to note are the necessity of thorough and deep ploughing and the getting rid of all weeds and jungle. It is an excellent practice to keep fallow land well ploughed. The Punjabi colonists on the Jamrao Canal know this, and often plough five or six times during the hot weather the land which is going to grow wheat; in consequence they have the best wheat crops on the Jamrao.

Alkali is found all over Sind, and where it is very prominent it is impossible for ordinary plants to live. It occurs in small patches and also in large areas, and if only present in moderate quantities, ordinary crops can be cultivated, but they require much water, and the yield is much lessened. When alkali land can be flooded from an inundation canal, coarse red rice can be cultivated. If this be continued for several years the alkali will gradually be washed down into the sub-soil. To do this, however, the land must be level, and each division must be watered direct from the water course, and the water must not be allowed to flow from one division to another. Otherwise the alkali is simply accumulated in patches at the ends of the plots. Alkali can only be got rid of by means of water, and rice properly cultivated is the easiest means of effecting this.

LAND TENURE.

In ordinary circumstances the owner of the land does not cultivate it himself, and seldom does he take any interest in it. Each year "haries" or tenants are engaged by the owner. He pays them in advance or from "Takavi," often about 50 rupees for one family, who will cultivate 10 acres. The "takavi" is returned in kind at harvest. On flow land the rent returnable to "Zemindars" is often one-half the produce; the latter pays the Government assessment or land tax. This is the "butai" system. On lift land the "butai" may be one-third to the "Zemindar" and two-thirds to the "Hari."

The number of crops in Sind is extremely limited. Rice is the most important; Jowar and Bajri come next, and wheat and cotton, with a small amount of oil seeds, chiefly jambo or rape. The other crops only form a very small proportion of the total.

Before much improvement can be effected in Sind agriculture, it is necessary to persuade the average "Zemindar" to take more interest in his land, and not to leave everything to the annual "Hari" or tenant. Then the next important improvement is the introduction of pulse crops to take the place of some of the bare fallows, as they not only give valuable seed, but supply fodder for the cattle and improve the fertility of the land.

Landowners let out the land in lots of about 20 acres, and share the crop with the tenants, consequently they may dictate to them what crops they must grow. This a very important factor. As the deputy director is held in high esteem by the landowners, they are generally willing to follow any of his recommendations. In the north of Sind the tenants occupy the land for several years, but in the south of Sind they are of a nomadic type, and often change every year.

KINDS OF COTTON GROWN.

The ordinary local cotton is a very low class. It has only ⅜-inch to ½-inch staple, and the yield is 7 maunds of 81 pounds per acre under good local cultivation, for which the average price recently has been 6 rupees per "maund."

For a number of years both "Afifi" and "Abassi" Egyptian cottons have been grown. Altogether 6,000 acres have been under cultivation with Egyptian cotton in Sind. The produce was collected by the cultivators and sent in different lots to the Mirpukhas Government farm, where it was sold by auction. It is quite evident that there were bound to be considerable variations in the quality, cleanness, and value of the different lots, but nevertheless for the first few years fair prices were obtained. The buyers were millowners from Ahmedabad and Bombay, and the exporters from Karachi and Bombay. Several of the millowners who were in the habit of sending buyers were accustomed to use imported Egyptian cotton, but they soon stopped attending these auction sales. They complained that they could not get a fixed grade, whilst when buying Egyptian cotton in Alexandria or Liverpool they got a certain grade which was uniform and could be depended upon to spin certain counts. For the purchase of Sind Egyptian cotton they had to send their agents on a long journey to Mirpukhas at a time of the year when malarial fever was very prevalent, and these agents, not speaking the Sind language, were a further disadvantage. To buy any quantity, they had to bid for a number of small lots, some of which were dirty and stained, whilst others were good. The gins in Sind are only suitable for short staple cotton, and as they were well engaged in this kind the buyers had great difficulty in getting their cotton ginned at local ginning factories. There does not, therefore, seem to be any possibility of the Indian millowners ever purchasing their Egyptian cotton direct from the cultivator, unless they could be assured that they would have considerable quantities of baled and graded cotton. The cotton broker is undoubtedly an essential link between the cultivator and the spinner. Egyptian cotton is perfectly new to the exporting firms, and the "Abassi" produced in Sind was certainly not to be compared with the Egyptian product. The "Afifi" quality, however, was strong and useful. If it had been cleaned properly, ginned, and baled it would certainly have sold at the rates of "fully good fair Egyptian brown." Both

"Abassi" and "Afifi" cotton shipped were never properly cleaned and were full of dirt and pieces of leaf. Experiments have proved that, here, as well as in Egypt, "Afifi" is a hardier cotton than "Abassi." The deputy director, Mr. G. S. HENDERSON, who has had considerable experience of farming in Egypt, is of opinion that, provided the cultivator gets 12 rupees per maund of 81 pounds for seed-Afifi, it will be more profitable to him than cultivating Sind cotton. "Afifi" produces in Sind about 5 maunds per acre, whilst the yield of Sind cotton might average 7 maunds at 6 rupees.

During the last two years the supply of water in the Jamrao Canal has been very short, and the cultivators, not being able to obtain sufficient water for the growing of Egyptian cotton, had to be released from the undertaking, which they have given when entering into possession of the land, to grow a certain proportion under Egyptian cotton. Until the Sukkur Barrage and the Rohri Canals are completed, it will be impossible, in view of the shortage of water in the canals, to grow Egyptian cotton on an extensive scale.

Fairly large trials have been made with a good class of American Upland cotton. It has the advantage of a short growing period, shorter than Sind cotton, and consequently it can be grown along inundation canals. There is a very large tract where it can be cultivated. It is a hardy plant, but it is easily affected by salt in the soil, and suffers considerably from white ants. During the past year some good yields were obtained by farmers, and in many cases it produces as much seed cotton as the neighbouring plots of Sind cotton. The following is an expression of opinion from a letter addressed by Messrs. GADDUM & CO., Ltd., Karachi, to the Deputy Director of Agriculture at Mirpukhas, as to the value of this American cotton grown in Sind:—

"We have been requested to write to you by Mr. ARNO SCHMIDT, the Secretary of the International Federation of Master Cotton Spinners, in reference to growing American seed-cotton in Sind.

"We are greatly in favor of this, and have seen samples of Kapas (seed-cotton) shown to us by Mr. SCHMIDT, and think the cotton would compare very favorably with Middling American cottons, and would fetch at ordinary times at least 1 pence to 1½ pence per pound more than ordinary Sind cotton in Europe. It is better staple than the American seed-cotton grown in Tinnevelly.

"We think a good market could be made for this cotton, and any exporters would buy it readily at profitable rates to producers, especially if it were obtainable in fairly large quantities and if there existed some certainty of it being free from ordinary Sind cotton.

"We shall be very pleased if you can put us in the way of purchasing some of this cotton, even if only 10 bales, which we would forward to our Manchester House and get their views as to what prices it would bring in Lancashire.

"Of course, a season like the present one is most difficult, as the price at present of ordinary Sind cotton is the same as Middling American; in other words, the price of East Indian cotton is not on a parity with American, and should be nearly one penny per pound lower.

"The serious difficulty experienced by us in dealing with growers of American seed-cotton has been that we have been offered their cotton on a sample, and when bulk has been inspected it has always had a percentage of inferior (ordinary) cotton mixed with it. If growers could be persuaded not to do this, and buyers could be sure of obtaining pure American seed-cotton unmixed with lower kinds, it would be a help to fixing a standard rate compared with ordinary cotton.

"In Broach, where the class of cotton is high and the staple good, the natives bring large quantities of inferior Kapas in from other districts and mix it, and thus make good profits, also the seed from this cotton deteriorates yearly, and gradually the original pure Broach cotton is disappearing.

"If this is done with American seed-cotton it will never, in our opinion, be a success, and prices that would be profitable to dealers would never be paid. We learnt that Messrs. TATA, of Bombay, are buying the cotton grown on the experimental farms at Lyallpur at six rupees per maund above the rate for ordinary cotton on the condition that the cotton is not mixed, etc.

"We have had some experience of American seed-cotton in the Tinnevelly district, where it is increasing rapidly and is readily bought by mills and exporters at evidently profitable rates to growers, as it is yearly increasing.

"This cotton is very well liked by spinners at home, and commands one penny per pound more in price than the ordinary Tinnevelly cotton.

"The amount of this kind of cotton has been so small up to now in any other district except Tinnevelly that it has hardly been worth exporters' while to bother about it. However, with reasonable prospects of the quantity increasing and quality being kept up, we are quite convinced that a good business might be done at rates which would compare favorably with ordinary Sind cotton from the cultivators' point of view.

"We shall be glad at any time to do anything in our power to help you in this matter or to hear from you at any time."

This letter is also interesting in so far as it shows that it is very difficult, if not impossible, to rely upon an Indian cultivator supplying the genuine article; he evidently cannot withstand the temptation of mixing inferior cotton with superior ones.

As the deputy director thought he would be able to persuade the "Zimindars," to plant American cotton-seed where they had previously grown Sindhi cotton, and as there is apparently no further attention by the cultivators required for the growing of American cotton, I discussed, on his suggestion, the question of substituting American cotton for Sind cotton with the Commissioner of Sind, and the final outcome of my interview with him was that the Government ordered 40 tons of American cotton seed (Triumph) from the British Cotton Growing Association.

At present Sind produces some 170,000 bales of Sind-cotton, and there is every possibility of the cultivation of American cotton being taken up in place of it. Egyptian cotton requires six to eight weeks' earlier sowing than American cotton and necessitates 22 waterings, whilst 12 to 13 waterings would be quite ample for American cotton.

GOVERNMENT FARM AT MIRPUKHAS.

The management is in the excellent hands of the Deputy Director of Agriculture, Mr. G. S. HENDERSON, who is very

practical in all that he undertakes. From what I could see the large landowners readily take up any suggestion he makes.

The following statement will be of interest:

At Daulatpur Mr. HENDERSON has reclaimed 400 acres of alkali land on the Egyptian method of land reclamation; on this tract he is growing at present cotton and the Egyptian berseem (clover). The latter is entirely a new crop for India, and in consequence of the success attained at Sind with this leguminous plant, experiments are being undertaken in practically all the provinces of India. Berseem is an excellent fodder, and at the same time gives back nitrogen to the soil. It is probably due to this crop that the Egyptian soil keeps so fertile. The 400 acres reclaimed will serve as a seed farm.

GINNING FACTORIES.

The gins are nearly all Platts' roller gins; they are largely owned by European export houses. The cotton arrives in farmers' bales, on the backs of camels, or on carts, at the gins, where it is ginned and put first into loose bales; after a few days these are hydraulically pressed in the same establishment. It seems to me a waste of time and wages to put cotton provisionally into bales. The only explanation for this twice pressing was that the hydraulic press worked so quickly that the gins could not deliver sufficient cotton to keep it employed all the week, consequently they had to work up a stock of ginned cotton, which they put into loose bales. When a sufficient quantity of these was ready, the hydraulic press was started. At none of the ginneries are there pneumatic suction pipes or automatic feeding appliances. The wages paid at the gins are 6 pence for men for 14 hours. The average turn-out per press is 300 bales of 400 pounds in ten hours. One hundred bales take up 20 tons measurement.

BUYING AGENCY.

In view of the introduction of American cotton into Sind on a pretty large scale it might be advisable to make arrangements

No. of Plot.	Crop.	Previous Cropping and Cultivation.	No. of watering.	Date of Sowing.	Date of Last Watering.	Total Canal Watering in cubic feet per acre.	Total Canal Watering in inches.	Total Rainfall in inches.	Produce in Pounds per Acre.	Remarks.
1	2	3	4	5	6	7	8	9	10	11
C. 4	Egyptian Cotton Abassi.	Berseem in Rabi, 1909. Twice ploughed, sammared and ridged. Seed dibbled on ridges.	15	15th April, 1910	24th October, 1910	114,207	31½	7.88	254 Seed Cotton	This crop is sown on ridges and the first waterings are given along the bottom of the farrows. No berseem sown in Rabi.
C. 5	Sind Cotton.	Berseem in Rabi, 1909. Ploughed four times and seed sown after the last plough and sammared.	7	19th May, 1910	23rd October, 1910	72,389	20	7.88	1,304 do.	No berseem sown in Rabi.
C. 6	American Cotton Boyd Prolific.	Berseem in Rabi, 1909. Twice ploughed and seed sown after the plough and sammared.	12	24th May, 1910	6th December, 1910	129,988	35	7.88	330 do.	Berseem sown broadcast on 25th September, 1910 Four last waterings for berseem.
C. 7	Egyptian Cotton Mit Afifi.	Berseem in Rabi, 1909. Twice ploughed and sammared and ridged. Seed dibbled on ridges.	20	15th April, 1910	7th December, 1910	168,514	46¼	7.88	342 do.	Berseem sown. Four last waterings for berseem.
D. 6	Sholapuri Jowar	Berseem in Rabi, 1909. Twice ploughed and seed broadcasted and then sammared.	9	27th May, 1910	15th November, 1910.	98,366	27	7.88	960 lbs. Grain and 7,500 lbs. Fodder	This crop is much later in ripening than local Sindhi jowar.
D. 7	Awned Bajri.	Berseem in Rabi, 1909. Twice ploughed and seed broadcasted.	6	18th May, 1910	28th September, 1910	61,960	17	4.88	60 lbs. Grain and 1,000 lbs. Fodder	This crop was a failure owing to insufficient watering.

NOTE.—A preliminary watering of 15,000 cubic feet per acre given to each plot to soften ground for cultural operations.

with one of the existing firms of exporters of cotton to guarantee through them to the farmer a fixed price above either the local cotton grown or a fixed price on the basis of middling American cotton in Liverpool. The deputy director thought that the farmers ought to be guaranteed an increase in price of 20 per cent. over that of Sind cotton, which is not half an inch in staple. It might be found advisable to set up a saw-ginning factory for the American cotton if the native can be taught to handle the saw-gins. I am told roller-gins, if run slowly, gin American cotton even better than saw-gins, as the fiber is not so much damaged by the rollers and knife, but, of course, the saw-gins turn out more work. I hear that the spinners of Bombay are in treaty with the Government as regards the establishment of a buying and ginning centre in Sind.

NEW LAND.

When the land through which the proposed Rohri Canal will pass is being opened up it will be advisable for the Government to insist upon a certain proportion of it being cultivated under cotton in accordance with the instructions of the Department of Agriculture. In this manner the Government would create free of charge a number of demonstration farms, and the cotton industry would be assured of an increased area, producing a good quality of cotton. It is beyond doubt that the large portions of land through which these canals will run are highly suitable for the cultivation of cotton, and it should be no hardship for the cultivators to accept such a stipulation. A similar stipulation was willingly agreed to by the colonists along the Jamrao Canal with regard to the growing of Egyptian cotton, and in the Punjab, along the Chenab Canal, the Government insists upon the rearing of horses, etc., for the army, by the farmers who have received new land along the canal.

I am now convinced, provided the Department of Agriculture will see that the cotton produced by the forty tons of American seed previously referred to, which ought to produce about 3,000 bales, is not mixed with the inferior local cotton, there

will be little difficulty in disposing of the crop, as it will be highly suitable for Indian, Japanese, and European millowners.

PUNJAB.

The total area is 89,000 square miles, of which 42,000 are cultivated. The population is 25,000,000.

Cotton is grown on 1,300,000 acres, of which almost a million are irrigated. During the previous season about 270,000 bales of 400 pounds each of cotton have been picked. The rainfall average for the Province is 23½ inches, ranging from 50 inches to 60 inches in the Sub-Montane tracts, to 6 inches to 7 inches only in the western part of the Punjab.

The great feature of the Punjab as regards agriculture is the following perennial canal system:

			Acres.
Chenab Canal,	irrigating	roughly	2,000,000
Baridoab,	"	"	1,000,000
Sirhind,	"	"	1,000,000
Western Jumna,	"	"	800,000
Jhelum,	"	"	800,000

The Upper Chenab Canal is under construction. It will irrigate the district of Montgomery, which is without doubt the most suitable cotton-growing district, and several experts expressed the opinion that the land along the Montgomery Canal ought to produce at least 50,000 bales of first-class cotton per year. This canal will be in working condition by 1914, and the cotton spinners should immediately approach the Government with a view to this new land being given out with the stipulation that a portion of it be grown under cotton in accordance with the instructions of the Department of Agriculture. The Agricultural Department ought to reserve an area of at least 400 acres for a large "nucleus" seed farm.

I was informed that the Government desired to give preference to the cultivation of sugar-cane in this district, but the climatic conditions for its cultivation are not favorable, it being

too dry; the land is much more suitable for cotton, and, moreover, it should be taken into consideration that sugar requires five times as much water as cotton. Wheat requires more labor than cotton, a factor which ought to be borne in mind in view of the scarcity of labor that will exist when the new district is being opened up.

I visited Lyallpur, the capital of the recently established Chenab Colony. Lyallpur was founded in 1896, and now it is a town with about 18,000 inhabitants. In the early nineties a solitary tree would have been famous as a landmark.

Mr. J. RAMSAY MACDONALD, M. P., describes the change which has come about in the Chenab Colony excellently in his recent publication, "The Awakening of India." He says: "The land was barren but for useless scrub and for short-lived fodder which sprang up after the rains, and on account of which the land paid a grazing rent of about one penny per acre. Across it roamed primitive nomadic peoples, who subsisted largely on cattle-lifting, and whose ways of life are well shown in a proverb which was current amongst them: 'My child, if you cannot steal, you will die of hunger.' An escort was required for caravans and cattle droves crossing this territory, and a regular scale of payment for protective services at the rate of 2½ per cent. of the value of the property guarded was accepted. A fee of 10 rupees was paid to the tribesmen to pursue and attempt to recover a stolen camel or buffalo. All that is changed. A canal constructed as an inundation channel in 1887 was made into an irrigation canal, and the country was ready for colonization at the beginning of 1892. The cattle-lifter is now handling the plough, and is being taught the allurements of the law courts. An area of 3,800 square miles — with another 2,000 within range — of which 3,000 are already allotted to cultivators, has been irrigated. In 1901, 83,000 people, drawn from congested districts of the north and north-west, and grouped in 1,418 villages, had settled upon it. They came with all their village communities — washermen, barbers, carpenters, smiths, sweepers — and settled in their new surround-

ings. Discouraged at first by many circumstances, not the least of which was a virulent outbreak of cholera, but encouraged by a good crop, they took root, and now they tell you merrily of their interesting experiences. 'I came on a camel,' said one of the cultivators to me, 'and now——' He left his sentence to be finished by a significant sweep of his hand across the landscape shaded by trees and rich in growing crops. Railways are running through the district and grain markets have been opened at different centres. The export of wheat from the area was 8,124,607 maunds in 1903, and each acre yields on the average 20 to 30 maunds. In addition to that, cotton is grown, 567,212 maunds having been exported in 1903. The land revenue amounts to one million and a quarter rupees, and the canal dues range between eight and ten million rupees. That is the Government income from the Colony, and it certainly does not represent more than a fair economic rent. Truly we can say this of the place: 'The desert shall rejoice and blossom as the rose.'"

The people of the Punjab are industrious and pretty good cultivators. They are even taking up ploughing with the steel plough, and reaping machines and other modern agricultural implements are gradually being introduced by the Agricultural Department. The cultivators are eager to take up any recommendation which the Department may make, and the officials recognize that in order to strengthen this confidence it is necessary that only such recommendations be made as experience has proved to be likely of success.

The cotton crop is well liked by the natives because the principal work connected with it falls at a time when no other pressing agricultural work requires their attention.

The Punjab is a province of peasant proprietors each owning 4 to 6 acres, but along the canal a holding is about 20 acres.

KINDS OF COTTON.

The Punjab produces two very nice indigenous cottons called "Hansi" and "Multan." They are 5/8 inch fully in staple, and

yield 7 to 8 maunds of seed cotton per acre. Their average ginning out-turn is 33 per cent., but some of the native cottons produce a 7/8-inch staple, and the ginning out-turn of some cotton round the town of Multan is as high as 40 per cent.

A ginner told me that a good deal of the Punjab native cotton is sold in Europe as Surtee-Broach cotton.

American cotton, from seed supplied by the Dharwar Government farm (where it was introduced some fifty years ago), has been grown along the Chenab Canal for the last seven years, and one might say that since 1908 it has been cultivated on a somewhat extensive scale. There is this year a crop of some 600 bales of this Dharwar-American cotton to be had, 400 bales of which have been sold to a large Ahmedabad spinning mill at the price of "fully good fair American, loco. Ahmedabad." Cost of transport on American cotton from Liverpool to Ahmedabad is calculated at 46 pence per pound. In former years this American cotton was sold by auction in an unginned condition, and the ginners had paid 2/- per 82 pounds more for it than for the local cotton. The Deputy Director of Agriculture told me that the Agricultural Department had not pushed the general introduction of this American cotton because it had kept improving from year to year, and before persuading the farmers to take up this cotton in place of the local cotton the department wanted to have a sufficient supply of pure seed. The department is experimenting also with a variety of Dharwar-American which is earlier maturing. If these experiments are successful it will be a great advantage, as that cotton would not require water at a time when the wheat crop is very much in need of it. Another of the reasons why the department is not anxious for the introduction of this kind of cotton was that the officials did not consider that the farmer obtained sufficient remuneration for this improved variety. I am inclined to think that in view of the unclean condition in which the cotton is picked in comparison with American cotton the officials as well as the cultivators over-estimate its value. Some of the exporters assured me that they had offered quite

a fair price for this American cotton in previous years; they had, of course, to take into consideration that it was always full of leaves, stalks, etc. These impurities get into the cotton during picking because the plants become very dry and brittle, especially after a frost. It must also be borne in mind that these cottons are not quite as even in staple as cotton from America. The exporters also told me that frequently local cotton seed is sown along with the American seed, which, of course, reduces the value of the latter. Such mixing benefits the farmer if undetected, because the local cotton has a higher ginning out-turn, but in a few years the deterioration owing to this mixing will be a very serious factor.

GINS.

In some provinces of India the export firms have their own ginneries, and no doubt when the amount of American cotton grown in the Punjab becomes important enough, one or the other export firms will establish a ginning factory, with saw gins, if necessary. At present all the gins are of the roller type. The ginneries of the Punjab are entirely in the hands of native firms, who, I am told, speculate largely in cotton. There is an ample supply of ginneries, and at any time one of these could be hired for the purpose of ginning this American cotton. Such a step would guarantee this cotton being kept pure, and I think the cotton exporters ought to consider it in their own interests to deal in a higher-priced article than the present cotton; their profit would then be correspondingly larger without their work being materially increased.

I met the owners of some of the largest ginning factories in the Punjab. They told me that they fix their price for the local cotton regardless of the length of staple. Their only gauge is the ginning out-turn. It is interesting to note that the ginning out-turn of the local cotton is now on an average 33 per cent., whilst in 1897 it was only 25 per cent. to 27 per cent. As mentioned before, some of the local cotton round Multān gives

a ginning percentage of 40, and the ginners assured me that they keep the seed of this cotton strictly separate and sell it to the farmers for sowing purposes.

MARKETING THE COTTON.

The cotton is bought outright by the ginner; only in rare cases does he buy direct from the farmer; the latter sells his crop to the "bania" or dealer, who frequently advances money on the produce before it is harvested. The "bania" collects various lots and sells them to the ginner. The cotton exporter buys the cotton from the latter. Ginners here do not gin on commission. After the cotton has been ginned it is put up in temporary bales called "boras," and then pressed again for transport. The same is done in Sind. Everywhere an enormous waste of labour is evident. I was pleased, however, that one ginner had a strong desire to reduce his wages bill. He was experimenting with a self-feeding apparatus which he had constructed for the gins, and when I spoke to him about the pneumatic transmitters of cotton as used in America he asked for full particulars. Owing to the enormous irrigation works which are being carried on at present in the Punjab (there are some 60,000 men engaged in their construction), labour has become somewhat scarce, and the wages for the men in the ginnery have gone up from 4 pence a day in 1907 to 12 pence at the present time. There is an amalgamation of ginners in Lyallpur, all pooling the profits of ginning and baling.

METHODS OF CULTIVATION.

The soil is generally either sandy or alluvial. The cultivation of cotton depends largely on the preceding crop; for example, when following sugar cane or Toria (Brassica campestris), the land is ploughed as many times as possible in the winter and irrigated for the sowing in April. The seed is scattered broadcast after the ploughing at a rate of 8 pounds or

10 pounds per acre, then the plough and the "sohaga" (plough harrow) are passed over. When cotton follows wheat there is very little time for preparing the soil for the sowing. In well-tracts the land is generally manured for cotton when it follows wheat. Sowing by drills or on ridges is scarcely known, and even sowing behind a plough in lines is carried on in a few places only. Intercultivation with a hand-hoe or a country plough is practised only once.

The Agricultural Department has demonstrated the advisability of sowing in lines and intercultivating with a hand-hoe or a plough after the first, third, or fourth irrigations. In the Lyallpur district six to seven waterings are given. Sowing in drills on the flat has given quite as good results as sowing on ridges, and therefore the latter system has been definitely abandoned by the Department of Agriculture. When seed has been sown on ridges more water is required in the field. Although the people sow broadcast, some run the native plough in between the plants, tearing up here and there a few of them.

ROTATION OF CROPS.

A good rotation, which is, however, not generally recognized, is wheat, oil seeds, cotton, wheat, etc. Singhi (Melilotus parviflores) is a leguminous crop, and is sown sometimes amongst the cotton in a similar was to "Berseem" (clover) in Egypt.

The land in the Punjab may be classed as growing: —

50 per cent. wheat.
25 per cent. toria (a rape seed [brassica campestris]).
16 per cent. cotton.
9 per cent. fodder (jowar, millet, etc.)

AGRICULTURAL LABOR.

As each tenant farms his own land, outside labor is rarely required. During the picking season a few women are employed who receive one-sixth or one-tenth of the cotton they pick in

lieu of wages. The yield per acre in the rainy tracts is 4½ maunds, and in canal tracts 6 maunds per acre. There are six to ten pickings in one season.

The following statement was given to me by a cultivator: —

First picking, 1 maund of 82 pounds of inferior quality.
Second and third picking, 6 maunds of best quality.
Last picking, 1 maund of inferior quality.
Average, 8 maunds of 82 pounds seed cotton.

It is very strange that the first picking in this province is of inferior quality, whilst in other provinces it is best of all.

The cotton stocks are cut and used for fuel.

Cotton is often manured in well-lands when following wheat, generally about two to three tons of farm manure are applied. When cotton follows sugar-cane there is no need for manure as sugar-cane is heavily manured. On all other lands no manure is used for the cotton crop.

FIGURE 15.—FARMER'S CART IN THE PUNJAB TAKING SEED-COTTON TO THE GINNERY.

SEED DISTRIBUTION.

Lyallpur Agricultural Station supplies selected seeds of "Hansi" and "Multan" cotton and of Dharwar-American in very small quantities. There is also a seed farm at Sargodha which supplies selected seed to the Jhelum Colony. The amount of selected seed supplied in this way is comparatively small. Here again I take the liberty of recommending that the system of seed distribution of the Central Provinces should be followed.

INSECT PESTS.

The boll-worm has done considerable damage this season, especially amongst the indigenous cotton; the only remedy applied was the parisite called "Rhogas Lefroyi"; this was discovered by the entomologist at the Pusa Research Institute, and is called after him. This parasite attacks the worm, lays its eggs in it, and kills it. I was informed that the introduction of this parasite by the Agricultural Department had been of some success, but, unfortunately, through some unexplained reason, the parasites died off in large numbers, probably through an attack from another parasite. One expert said that he would try next season the experiment of passing a rope round the cotton plants and shake them whilst the field is being irrigated; he believes that the worms will fall off through the shaking of the plants and will drown in the water. Experience is shown that when there is a strong wind during the period of irrigation many boll-worms drop and perish in the water.

LYALLPUR AGRICULTURAL COLLEGE.

There is an Agricultural College at Lyallpur, and efforts are made to induce the sons of farmers to study there. So far this aim does not seem to have been achieved, as the last annual report of the college contains the following paragraph: "Most of the men have no object except to win an educational qualification which will secure them service under the Government. The college is not popular with the classes we wish to attract, nor indeed with any class."

FIGURE 16.—AGRICULTURAL COLLEGE AT LYALLPUR, PUNJAB.

FIGURE 17.—AGRICULTURAL COLLEGE AT CAWNPORE.

The other agricultural colleges in India have had similar experience with their students, but an improvement seems to be making itself felt.

In connection with the Agricultural College is a demonstration farm which is well managed by the Professor of Agriculture, Mr. W. ROBERTS.

Results at this farm for the past few years have shown that Ridney, Spence, Caravonica Tree cotton, African and Egyptain cottons have been failures, principally owing to the lateness in maturing. In October and November severe frosts occur regularly, the crop must therefore be quite ripe by that time. The best cottons in the Punjab appear to be the Dharwar-American cottons and the indigenous cottons. Six Dharwar-American selections have been up to date handed over to the Professor of Agriculture, Punjab Agricultural College, Lyallpur, for trial on larger areas before finally being recommended to cultivators.

A new Government farm is being laid out by the deputy director, Mr. S. MILLIGAN, at Gurdaspur; its area is 104 acres, but hardly any of it will be utilized for cotton. Mr. MILLIGAN possesses a thorough knowledge of the conditions obtaining in the Punjab, and is a valuable asset to the Department.

BUYING AGENCY.

A buying agency in the Punjab would undoubtedly be a stimulus to the growers to cultivate long staple cotton, but owing to the frequent mixing of various kinds of cotton, none but an old established firm could protect the interests of the spinners.

UNITED PROVINCES OF AGRA AND OUDH.

These provinces are divided into the Western district with its centre round Aligarh, and the Southern district with Cawnpore as its centre.

WESTERN DISTRICT.

The Aligarh farm is under the direct supervision of the deputy director, Dr. A. E. PARR, who has considerable influence amongst the cultivators.

The cotton area of the United Provinces is normally 1,500,000 acres, yielding about 350,000 bales, equal to one-fourth bale per acre, say 100 pounds. The low yield per acre may be partially accounted for by the fact that cotton is frequently sown with other products such as "Bhindi" (lady's finger).

WATER SUPPLY.

The Western part of the United Provinces is well supplied with perennial irrigation from the Granges and the Jumna. The district thus irrigated forms the most important portion of the cotton growing area of the United Provinces. In normal years 25 to 30 per cent. of the cotton in this district is irrigated, whilst the remainder is grown on natural rainfall. A new irrigation canal, the "Hathras" Canal, has just been opened; it irrigates the district where cotton has already been grown under natural rainfall, but there will probably be an increased yield per acre in consequence of the irrigation.

LAND TENURE.

There are small holders of land of, say, ten acres, who cultivate their holdings themselves. There are also large landowners who have tenants who must be divided into two classes, viz: — (*a*) permanent right tenants, (*b*) tenants at will; the latter can be ejected at any time, but the former are tenants for life.

The landlord pays half of the rent he receives to the Government as assessment; the rent varies from Rs. 3 to 3.12.0. per acre; the water used for the canals is paid for separately, the rate for cotton is about Rs. 2. 8. 0. per acre. Each kind of crop has a different water-tax.

The soil is loamy.

KINDS OF COTTON.

The variety grown is ordinary Bengal (G. neglectum); it has an average staple of $\frac{5}{8}$ inch; its value is almost entirely dependent upon the ginning out-turn, and the colour also affects

it slightly. The ginning out-turn of the ordinary local cotton is about 33 per cent. fibre, but Dr. PARR has 500 acres under cultivation of an improved indigenous kind that yields 39 per cent. fibre. The Agricultural Department is using every effort to improve this kind, and next year there will be some 2,500 acres of this cotton grown under the Department's supervision. This cotton is being introduced simply on account of the high ginning out-turn, which makes its cultivation to the farmer much more lucrative than that of American cotton. The staple of the new variety is ½ inch, and the yield 10 maunds of 82 pounds on good soil.

Until two years ago some nice American cotton of one-inch staple was grown in the district of Aligarh and sold at the same price as that ruling for American middling. In spite of the fair price paid by a Calcutta spinning mill, the cultivation of American cotton was not remunerative to the farmer. The difference in price between American and local East Indian cotton did not prove sufficiently high. The yield per acre was not so great for American cotton as that of the indigenous cotton, and the ginning out-turn was also less. The American cotton was grown around separate villages and had to be collected, causing some extra expense. A spinner who had used that cotton expressed to me his high satisfaction with its quality. The Agricultural Department and the native, after fully proving the reduced profit derived from the cultivation of this exotic kind, have definitely given up the idea of growing American cotton and are concentrating their attention on introducing the high yielding indigenous kind mentioned before, and I certainly consider that their action is a right one.

CULTIVATION.

The sowing season is in May on irrigated land, and in June with a rainfall on unirrigated land; the soil is extremely hard at this time of the year, in fact it would be impossible for the steel plough to enter it, therefore the cultivator floods his field to soften the ground, allows it to dry sufficiently in order to per-

mit the wooden native plough to enter the soil. After watering the field he sows the seed broadcast, then ploughs it in and rolls it, as is done in the Punjab; watering and hand-weeding are carefully performed. It is the general opinion of the cultivator that too much preparation of the soil is no advantage as regards the yield of the crop, and therefore he leaves his field fallow during the winter season, during which time the roots and short stalks of the previous crop are left in the ground. The soil even at the beginning of winter is so hard that one cannot pull up the roots.

Many cultivators in the district gin sufficient cotton with a native hand-gin, "Churka," to enable them to sow their fields with the seed thus obtained. This is said to be an advantage, as the power gins often cut the seed and thus destroy its germinating power.

FIGURE 18.—GINNING COTTON BY HAND (CHURKA.)

Picking begins in October and lasts until the end of December; the first and last pickings are considered inferior in quality and yield to the middle pickings.

After the picking has been finished the cattle are allowed to graze on the cotton fields.

GINNERIES.

The ginneries are mostly in the hands of native firms; they are all roller gins, single and double action. As the cotton is picked in a dirty condition it is customary in practically all the provinces to pass the cotton through an opener before ginning it. In this district proper export bales are pressed at once, that is, without first making the loose bales as is the custom in Sind and the Punjab. Ginning factories work, generally, three days, and the cotton ginned during that time is pressed on the fourth day. To a fairly large extent the ginners buy the cotton from the "bania," but those who gin on commission charge 7 pence per 82 pounds seed-cotton, and about Rs. 3 per bale for pressing. The wages of the men at the press are 6 pence, those of the women at the gins 4 pence.

ROTATION OF CROPS.

The following may be considered as representative on irrigated land; it has the disadvantage, however, of there being too few leguminous crops:

Wheat, 6 months.
Cotton, 8 months.
Barley and peas (mixed), 4 months.
Maize, wheat etc., 6 months.

On unirrigated land cotton, jowar (millet), and Raha (a kind of pea), are often grown mixed.

INSECTS.

The boll-worm did considerable damage last season; so far no remedial measures have proved of value. The cotton sticks

are cut off for fuel, but the roots remain in the soil; perhaps this is one of the causes of the prevalence of boll-worm.

PROBABLE EXTENSION.

If cotton remains at the present high level of prices the area under cultivation will increase at the expense of other crops, otherwise there is not much probability of extension. The yield per acre can, however, be materially increased through the introduction of cotton which gives a high ginning out-turn, and this has been done in some cases. A further increase must be expected from the gradual though slow introduction of improved methods of cultivation.

If the rains had not failed last season at the time of sowing there would have been an increase of some 25 per cent. on the acreage under cotton.

The cultivators in this district generally are ready to take up improved varieties of new seeds, and I was told that the native cultivators are no more conservative in the methods than are the English farmers.

CAWNPORE DISTRICT.

In the report on my first visit to India I criticised somewhat unfavorably the conditions of cotton demonstration work on the Cawnpore agricultural farm. I was sorry to see on my return that no improvement in this respect had taken place. In justification of the deputy director who has charge of this farm I must say that he has been absent for a year and a half on special duty in connection with the Allahabad Exhibition. It was most disheartening to find in such a large cotton producing area that the Government farm should devote only two acres out of 80 to cotton growing experiments, and some of these were very neglected. I was told that as regards the yield of some of these experimental crops it was impossible to arrive at any definite conclusion owing to the mixture of varieties grown in the plots. The experiments which I saw were certainly not

encouraging, and would have acted as a deterrent to any farmer visiting the Government farm.

I complained about the lack of demonstration work as regards cotton on this farm to the officiating Inspector-General of Agriculture, and at the same time I urged the Cawnpore millowners to pass the following resolution:—

"Whilst recognizing the usefulness of the botanical research work at Cawnpore, this meeting of cotton millowners is of opinion that the Department of Agriculture in the United Provinces should establish seed farms on the lines of those instituted by the Central Provinces Department of Agriculture, which have been an unqualified success, as it is of opinion that only by such a system of seed farms distributed all over the Provinces can suitable strains of cotton be kept pure. Such seed farms are in addition most valuable for purposes of practical demonstration and can be worked, if properly managed, free of cost to Government."

I am pleased to say that I have received the following communication from the officiating Inspector-General:

"In continuation of my letter, No. C/417, of 7th January, 1912, addressed C/o Bengal Chamber of Commerce, Calcutta, I have the honor to say that I have been in correspondence with the Director of Agriculture, United Provinces, and I am pleased to inform you that he has taken measures for the improvement of cotton at Cawnpore and other parts of the United Provinces on a more extensive scale than hitherto, and on the lines already so successfully carried out in the Central Provinces and Madras. I trust this information will dispel any anxiety you may have felt in regard to the treatment of this crop in the United Provinces."

BOTANICAL RESEARCH WORK.

Excellent work is being carried on at this farm with regard to botanical research by Mr. H. MARTIN LEAKE, M. A. Research work naturally takes up a number of years before results of much practical value are attained, but I am inclined to think, from what I have seen, that Mr. LEAKE has arrived at a stage when his several years of labor will prove of real value to the

cotton grower. He has obtained, through crossing, a number of varieties which he intends to grow this season under field cultivation, and for this purpose a seed farm of 211 acres has recently been acquired in the neighbourhood of Aligarh. In explanation of his work the following notes may be of interest:—

During the last ten years science has made considerable progress in the field of plant-breeding, and the impetus which has been given in this direction and to what is now generally known as the Science of Genetics, dates from the rediscovery of Mendel's work. The fundamental idea of this new line of work is that the form of a plant is decided by the presence or absence of definite units or characters. Each such character (except in a few cases where "coupling" between characters occurs) behaves independently and must be considered separately.

In hybridization work, when one plant possessing a particular character is crossed by another lacking that character, there will appear in the second generation plants, some of which will possess, and some lack, that character, and from these it is possible to breed with confidence two pure races which will remain pure — one possessing and the other lacking the character in question. Now suppose there are two plants, one possessing a desirable character lacking in the second, while the second possesses a desirable character absent in the first; in the second generation of the cross between these two, (in the absence of "coupling") four types of plants will be found. Two of these will possess one of the desirable characters and lack the other — these are the two parental forms. The other two are new types, and of these one will possess both desirable characters while the other will lack both. It will also be possible to raise all four types obtained from the cross in a pure condition.

Such, in its simplest form, is the method of improving races of economic plants which recent discovery has rendered possible. As applied to cotton it will be understood that, given, for instance, a long stapled race but late flowering and a short stapled race which is early flowering, it is possible to isolate a

pure long stapled early-flowering race. It is not meant to convey the idea that the process is in all cases as simple as above stated (difficulty arises in determining what actually constitutes a unit character), but, in the absence of "coupling"—and it may be noted that "coupling" has not been found to occur in any of the essential characters of the cotton plant—it is possible to isolate races possessing a series of desirable characters such as is possessed by no race at the present time. Further, a race so produced will prove as constant as any of the races now found in cultivation.

Mr. LEAKE has crossed some of his selected strains with a red flower, because he will then be able to distinguish easily when a cultivator has mixed the seed with other kinds, as the cotton generally grown in the United Provinces has a yellow flower.

BURMA.

The following report has been received from the Director of Agriculture, Burma:—

Kinds of Cotton Grown.	Length of Staple.	Approximate Quantity Grown.
I.—Wa-gale (White) Wa-pyu (White) Gossypium neglectum, Var. vera, sub-var: Burmanica (Annual).	½" to ¾"	This is the commonest variety grown; it is cultivated in almost every district of dry Central Burma and supplies practically all the staple of commerce. Average about 180,000 acres.
II. Wa-ni (Khaki-colored) G. neglectum, var-vera, sub-var: Kokatio (Annual).	about ¾"	(Sparingly cultivated, chiefly for local consumption. Of no commercial importance.
III. Wa-gyi (White). G. obtusifolium, var: Nanking (Perennial tree cotton).	Said to be slightly longer than that of I.	(Commonly grown in Myingyan, Thayetmyo and Minbu), The area under this variety cannot be separately calculated: it is included in No. 1.
IV. Shan Cotton (Khaki-colored). G. neglectum (Annual).	Short.	Not known, but smaller Said to be grown throughout the Shan States), and used for local manufacture. Little importance commercially.
V. Chin Cotton (Annual).	Short.	Small (Chin Hills) for local consumption.
VI. Thinbaw-Wa (the Pernambuco, Chain or Kidney Cotton) G. brasiliense (Perennial tree cotton with white lint).	1.5" (Long, silky, and fairly strong).	Up till a short time ago only scattered trees of this variety were found. It is now being tried on a commercial scale in the Amherst district; but no results are as yet available.

The final forecast of the cotton crop for Burma for 1911-12 gives 183,075 acres under cotton with an estimated yield of cleaned cotton of 34,000 bales of 400 pounds each. This return refers to the eleven districts in which cotton is of commercial importance. The remaining area is about 1,500 acres; produce locally utilized.

SOIL.

"From the richest loam to the poorest up-land." The Burman will not grow cotton on land which is suitable for paddy (rice); so that the chances of its being grown on irrigated land are small.

On Yas and Kaing lands.

On poorer soil than is required for sessamum (in Shwebo); medium cotton soil (in Sagaing); on the poorest of cultivated soils (in Sagaing); good to medium soils (in the Myingyan-Meiktila-Sagaing area); also on red marly soils full of pebbles (in the above area); from stiff clays to the poorest stony sands (in Myingyan).

The soils in Myingyan vary from stiff clays (*e. g.*, black cotton soil) to the poorest stony sands. But black cotton soils are not the favourite soils for cotton cultivation in Burma. The best cotton soil in Myingyan is a rich silt which forms on the lowest ground in parts of the district.

METHOD OF CULTIVATION.

In Thayetmyo (one of the largest cotton growing districts) cotton is sown, mixed with other crops, in yas, broadcast. The crops with which it is mixed are paddy and sessamum. Two weedings are made — one before and one after the mixed crop is reaped. The cultivation is generally of the roughest description. In Magwe, it is sown as a mixed crop with sessamum or Lu (Panicum miliare). In Shwebo it is sown in rotation with sessamum and pyaung (Sorghum vulgare) or on fields that have already produced a crop or two of sessamum. In Sagaing it is rotated with pyaung, sessamum, and fallows, or the land after cotton is fallowed for a number of years and then

sown with sessamum. Wa-pyu or Wa-gale is usually sown in May or early June and plucked at the beginning of November. The land is occasionally manured with cattle dung, if available, and harrowed once before the rains break. Ploughing may or may not be done subsequently, the requisite tilth being obtained by the use of the harrow alone. The seed is sown broadcast at the rate of 1½ basket (bushel) of ginned seed per acre; weeding is invariably done by means of a small hand spade. After plucking, the cotton is dried in the sun and carried in carts to the mills. Wa-gyi (in Myingyan) is a large tree cotton which is but occasionally cultivated or grown in gardens.

Methods of cultivation in (Myingyan): Seed sown, after harrowing, at the rate of four baskets per acre, and covered with the 3-toothed harrow. When about 10 inches high the crop is thinned by the harrow and several weedings given. There are three or more pluckings when the crop is ready, and the seed cotton is carefully dried in the sun before being carted to the mills.

TREE COTTONS.

"The possibility of successfully cultivating tree cottons in Burma on a commercial scale has not yet been satisfactorily established." The general unsuitability of the Lower Burma climate and soil for cotton has been indicated by failure of various Egyptian and American cottons experimented with at Prome and near Rangoon. But the long-stapled Pernambuco cotton cultivated by Miss HASWELL in Amherst District was good enough to take a diploma of honour at the Franco-British Exhibition (1908). A Northern Shan States variety is promising.

SEED DISTRIBUTION.

There are no seed farms yet, but it is hoped to establish some soon. The Agricultural Department distributes a little seed each year—as far as possible; but the cultivator chiefly saves his own seed, or obtains it from the mills. There has been a marked deterioration in recent years. The matter is receiving attention.

Ginneries are mostly modern mills in the hands of large firms — the Burma Cotton Company and Messrs. Jamal Brothers. For home manufacturers, especially in the hills, ginning is largely done by hand. An effort is made to select seed, but it is not too carefully carried out. Seed farms under the Department of Agriculture are the only effective means of guaranteeing good seed.

The crop is generally bought by millers at their mills. The cultivator carts in the produce and sells for the best price he can get at the mill. Not usually bought before maturity; though since mills have been started at Myingyan, the system of brokers who buy forward has crept in, as in the rice business.

Land is chiefly held by small landowners, who will generally adopt advice which is proved to be for their benefit.

EXTENT OF CULTIVATION.

"Cotton will only be a very secondary crop over the whole of Lower Burma, and in those districts of Upper Burma where irrigation can be obtained."

Now cultivated chiefly in Meiktila, Myingyan, Sagaing, Lower Chindwin, Thayetmyo. (Burmans will grow it only when the market for it is assured.)

But also to some extent in Akyab, Northern Arakan, Sandoway, Prome, Pakokku, Minbu, Magwe, Mandalay, Shwebo, Kyaukse, and Yamethin. Possible to extend it in Minbu, Pakokku, Magwe, Shwebo, Yamethin, and Prome.

	Present Area. Acres.	Further Area Available. Acres.	
Akyab,	547	100,000	that is, for Ya
Prome,	1,529	8,000	mixed cultiv-
Amherst,	—	—	vation.
Thayetmyo,	19,833	25,000	
Pakokku,	377	3,397	
Minbu,	2,847	—	Not known.
Magwe,	3,712	—	
Mandalay,	8	—	
Shwebo,	914	—	

Sagaing,	48,223	nil
Lower Chindwin,	12,998	25,000
Meiktila,	36,161	8,380
Myingyan,	65,511	—

Arakan might prove suitable for tree cottons.

Prome and Thayetmyo.—There is a likelihood of increase.

In main cotton belt (comprising Meiktila, Myingyan, Lower Chindwin, and Sagaing). — Possibilities of extension and

FIGURE 19.—FINAL SELLER OF COTTON GOODS IN A SMALL VILLAGE IN INDIA.

improvement are not at present very encouraging, because it is a rotation crop, and because of short sowing period (limited, as a rule, to ten days). A good year for cotton is generally a bad year for other crops.

Reasons against possibilities of extension are: —

1. Inferiority of staple.
2. Precariousness of the seasons.
3. Cost of labor and transport.
4. Conservatism of the Burman.

"Burma may have a great future in cotton, but the variety that will give it this future has yet to be discovered."

MARKETING OF COTTON.

By far the largest proportion of the Indian crop is sent to Bombay, where it is mostly stored in the open air on the Bombay "Cotton Green." Hundreds of thousands of bales are lying in stacks neatly packed, but entirely unprotected from the weather. Men smoking cigars and pipes pass to and fro between the stacks, and it is almost a miracle that fires do not occur more frequently. Owing to the recent extensive destruction of cotton by fire on the "Green," it is hoped that preventive measures will be taken. The Bombay Cotton Trade Association, Limited, has its exchange or sale rooms on the Cotton Green, and its rules and regulations, which will be found in the appendix, govern all cotton transactions.

The cotton from the south of the Madras Presidency is shipped via Madras and Tuticorin.

Owing to the small margin existing during the last season between the prices of Indian and American cotton, many of the Indian millowners have bought this season considerable quantities of American cotton. At the end of December they had on order as much as 200,000 bales of American cotton, whilst in normal years the total annual consumption varies from 15,000 to 20,000 bales only.

The transport expenses of American cotton from Liverpool to Bombay are .46 of a pence per pound. A Cawnpore spinner

who has also bought this season American cotton informed me that all his American cotton must be repacked and pressed in Bombay on arrival, as the insurance companies consider the careless and defective packing of the American bales a greater risk than the well-packed Indian cotton bales. If the American cotton were not repacked in Bombay the spinner would have to pay a higher premium of insurance for the whole of his cotton store.

SUMMARY AND CONCLUSIONS.

IMPROVED STAPLE COTTONS.

It is now recognized by the Government experts and others that the cultivation in India of exotic types of long staple cotton, longer than indigenous kinds, must be confined most entirely to irrigated districts. Whilst long staple cottons can also be produced in a few non-irrigated tracts, it has been clearly demonstrated that, with the exception of Tinnevelly cotton in Madras and Broach cotton in Gujurat, the cultivation of long staple cotton in unirrigated parts is not economically sound; the cultivation of indigenous cottons proves more remunerative to the farmer in non-irrigated tracts, owing to the higher ginning out-turn in percentage of fibre, to the higher yield per acre, and to less attention required. Nevertheless, the prospects of the production of long staple cottons in India are decidedly favorable in the following Provinces: Sind, Punjab, Gujurat, Southern Madras, and the Central Provinces. Spinners and all interested in the cultivation of long staple cottons in India should look upon this as a definitely settled opinion, arrived at after many years of careful investigation. The prospects of an extension of the area for these cottons lie mainly in the irrigation of hitherto dry tracts.

Staple cotton of almost equal quality to Middling American, and in some cases superior, is grown in India in the following Provinces.

MADRAS.

Some six years ago, Mr. A. STEELE, of Messrs. A. & F. Harvey, detected in a gin, mixed with the ordinary Tinnevelly, an American kind of cotton, but superior to American in quality and ginning out-turn. This cotton was traced to Cambodia, in Indo-China. It has a full inch staple, is uniform and glossy, of fine fibre, and somewhat creamy in appearance. Mr. STEELE found four years ago that the ginning out-turn of this cotton was 44 per cent. against the ordinary Tinnevelly of 31 per cent. lint. This, as well as the superior quality, induced him to grow on a small piece of land the seed obtained from the lot accidentally found in the gin, and from that time Cambodia cotton has made rapid progress. Three years ago the crop was 5,000 bales, last year 30,000 bales, and this year it is expected to yield 80,000 bales of 500 pounds each. This "Cambodia" is an extraordinarily heavy yielder. One may take the average per acre as 400 pounds to 500 pounds of lint, but under special conditions as much as 2,000 pounds of seed cotton (=660 pounds lint) are said to have been picked from one acre. If one remembers that the average yield of the Indian cotton is hardly more than 100 pounds, one can easily understand that this new cotton has created a great stir amongst the people. Moreover, there is the advantage that Cambodia cotton, which is known in Liverpool by the name of "Tinnevelly American," grows well in the red soil of the Madras Presidency, which so far had not been used for cotton. Chili, tobacco, and, in some cases, rice were mostly grown in this soil. The introduction of Cambodia has not, therefore, interfered with the quantity of the ordinary well-known Tinnevelly cotton which is grown in black soil. The crop of the latter is estimated this year to be about 90,000 bales. The possibilities of the extension of Cambodia are enormous. One cotton spinner, who has a thorough knowledge of the south of India, thought that in ten years' time quite a million bales of this cotton would be produced. Whilst the picking of Indian cotton generally is carried out in the most

careless fashion, it is important to note that the cotton in the south of India is generally clean and carefully picked.

In the south of India the cotton mills spin 40's with Cambodia. One spinner told me that he uses it alone for a good 30's twist, and also for mixing with a low Middling American to improve the quality.

To prevent the degeneration of Cambodia cotton seed, I think the Government would be well advised if they were to devote one large seed farm exclusively to this kind of cotton.

SIND.

Egyptian cotton has been grown for several years, but owing to insufficient water supply in the Jamrao Canal it is considered unwise to continue the cultivation of a cotton which requires so much more water than other kinds of cotton. It has therefore been decided to substitute Egyptian cotton by American, and some forty tons of "Triumph" seed have been ordered from the British Cotton Growing Association for distribution in this district. Black Rattler American cotton has been grown by several farmers in Sind, and Messrs. Gaddum & Co., Ltd., have valued this Sind-American cotton at 1 penny to 1½ pence per pound more than the ordinary Sind cotton, and expressed the opinion that it is better than American seed-cotton grown in Tinnevelly. It is anticipated that Sind will produce this year 2,000 bales of American cotton of 1-inch staple and white in color, but eventually it ought to produce about 150,000 bales. It has been proved that the yield in weight per acre in the Sind district of American cotton is exactly the same as the yield of ordinary Sind cotton.

The extension of cotton growing in Sind is largely dependent upon the construction of the Rohri Canal and Sukkur Barrage.

PUNJAB.

This season some 600 bales of an American kind have been grown along the Chenab Canal from the seed which was acclimatized in the south of India. An Indian millowner paid, during

my visit to this district, for 400 bales of this cotton the price of fully good fair American. There is an extension of the irrigation system being carried out which will be completed by 1914, and should open up a district which ought to supply very soon 50,000 bales of the same kind of cotton.

GENERAL PROVINCES.

Fifteen hundred bales of Buri cotton of ⅞-inch to 1-inch staple have been raised last season, the whole of which has been bought by one of the Nagpur spinning mills at about one half a penny per pound above Liverpool prices of Middling American. There is the possibility of extension of long staple cotton in Chattisgar, where some 15,000 bales might be grown, either of Buri or of the above-mentioned Cambodia cotton. The advantage of Buri cotton is that it grows in water-logged districts, and is quite wilt-resisting.

GUJURAT.

The fine cotton produced in Nausari is entirely consumed by Ahmedabad mills. This is the finest Broach cotton. In the Surat district an improved Broach cotton of ⅞ inch to 1 inch of white color has been produced under the guidance of the Department of Agriculture, and this year, in spite of the unfavorable weather conditions (drought), 2,400 bales of this cotton have been produced. The Bombay millowners have established a buying and ginning centre for this cotton, guaranteeing the farmer five per cent. above the price of ordinary local cotton. There is every probability that in consequence of this inducement the cultivation of that cotton will materially increase.

DHARWAR.

Dharwar in the south of the Bombay Presidency, is known by the Dharwar American cotton, but this has degenerated, and the Department of Agriculture is replacing it by Cambodia and the improved Broach cotton from Surat.

BUYING AND GINNING CENTRES.

The Department of Agriculture has in the past encouraged farmers to take up new kinds of cotton on very small trial scales. This, according to my opinion, must result in an inadequate price being paid to the farmer. When, for instance, a man raises 20 pounds of long staple cotton and 200 pounds of ordinary short staple cotton, he cannot expect to receive a remunerative price for the 20 pounds as nobody can use such a small quantity of cotton to advantage. The collection of small lots is expensive and causes different varieties to be mixed together. I am convinced that the Agricultural Department should not begin distributing the new kind of seed until it is quite sure that its cultivation will be remunerative to the farmer and until it has a sufficient quantity of seed to produce several thousand bales. Only then will the natural demand from various sources spring up. Government officials and farmers are apt to estimate the value of their produce at too high a figure, and in comparing the price of cotton raised in India with that of American cotton in Liverpool, they ought to take into consideration that Indian cotton contains a large amount of dry leaves and impurities, and is frequently subject to the admixture of inferior kinds.

The purpose of the buying agency is to guarantee the farmer a fixed premium on his long staple cotton, and to keep the superior seed apart from the ordinary kind. This can be done, in my opinion, by the European spinners without the necessity of establishing their own ginneries or buying firms in India, where, contrary to the conditions in Africa, in all the cotton-growing districts well-known European cotton firms already exist, and some of these are willing to act for the European spinners as agents between them and the long staple cotton grower. As is well known, many fraudulent practices exist in the handling of cotton in India, more so perhaps than in any other country, and the cotton buying firms established there would not be so easily duped as any new concern. Moreover, the spinner would have somebody to fall back upon, if frauds

did take place. Nowhere is the cotton broker or merchant more necessary than in India.

Another difficulty is that of the various native languages, and for this reason also it would not be advisable for a European association to embark on establishing its own buying and ginning agency in India. The Bombay Millowners' Association have started recently a buying and ginning agency in the neighborhood of Surat, and are having their cotton ginned by one of the existing firms, and whatever steps are undertaken by the European spinners as to the establishment of buying centres these should be in co-operation with the Indian millowners. The cotton would have to be sold to the highest bidder, and whether it is consumed by Lancashire, India, Japan, or the Continent does not materially matter, as a corresponding amount of American cotton will be set free.

Ginneries can be hired everywhere for a whole season, thus the danger of mixing seed of various kinds can be obviated. These ginneries would have to be hired by the firm entrusted with guaranteeing the farmer the fair price.

On these lines I am in favour of assisting the growers of long staple cotton first in Sind and Gujurat (Surat), and later in the Punjab, Dharwar, and Central Provinces. Madras Presidency does not require such a stimulus, as the natural demand for its long staple cotton is coming from all parts of the world.

An Indian spinner who has also experience of Lancashire mills, told me that very few Lancashire spinners knew how to prepare East Indian cotton properly; he said it required extra treatment in the blowing-room, owing to the dirty condition in which the cotton is generally picked in India.

FRAUDULENT PRACTICES.

Flagrant fraudulent practices are carried on in Berar and the Central Provinces in connection with the damping of cotton for the purpose of increasing the weight of the bales. I am pleased to say that, as a result of my bringing this matter to the attention of the Government, they are now watching this matter and

are already endeavouring to stop the watering of cotton by means of a hose-pipe. The spinners will do well to carefully examine all cotton coming from India as to any excessive damp and to report such cases to the offices of the International Federation if possible, stating the district where the cotton has been grown. The use of saltpetre and seed-cotton for weighting the bales in the north of the Madras Presidency should also be stopped.

The mixing of different kinds of cotton before ginning is another very serious matter which ought to be prevented by the Government, because it is not only that the spinner is deceived in his purchase, but that the seed of two or three different types becomes mixed and is then sold again for sowing purposes. It is this latter circumstance which is much more serious than the first. On the one hand the Government are spending large amounts of money to keep the seed pure and improve the cotton cultivation, and on the other, the Government are allowing the ginners to counteract the benefits resulting from the efforts of the Department of Agriculture.

The mixing of various cotton and of waste cotton from the spinning mill, such as is carried on at Hubli, ought also to receive the attention of the Government, as it must necessarily create a bad reputation for the Indian cotton, and, moreover, it should be considered a criminal offence to sell a certain kind or quality of cotton which has been intentionally depreciated by the admixture of inferior kinds and dirt.

STATISTICAL CROP RETURNS.

Since drawing attention in my first report to the defective methods used for obtaining the figures of the total crop of India, various resolutions have been adopted by the cotton spinners practically all over the world recommending the adoption of a system of ginners' returns, that is, a fortnightly census of the number of bales pressed.

I was informed that the Commercial Intelligence Department had taken this matter seriously in hand, and that an effort to

comply with this request will probably shortly be made. The difficulty so far exists with regard to the native states where a large amount of cotton is grown. The Governments of these cannot be forced to supply statistical information of any kind, but as some of the native states have even recognized the usefulness of higher agricultural work and have established their own Departments of Agriculture with European experts at the head, it is evident that from the more important and enlightened native states these returns would be forthcoming.

The spinners will do well to see that a trial of the fortnightly ginners' returns is made in India.

DEPARTMENT OF AGRICULTURE.

The Directors of Agriculture are members of the Indian Civil Service and occupy these positions frequently for short periods only. Their functions are mostly administrative. The technical experts are the Deputy Directors of Agriculture, whose position is inferior to the former. The deputy directors are men who have been trained at a British university and have had experience in practical farming. The Government must be congratulated upon the excellent selection they have made for these posts. I found the deputy directors all hard-working, and taking a keen interest in their duties.

The enormous tracts of country which they have to cover are such that it is impossible for them to visit all the outlying districts, and it is therefore of the utmost importance that Government should be induced to engage at least for every province an additional European duly qualified agricultural expert. There would then be three European deputy directors in each province, and I do not think it is too much to ask that one of these should specialize on one of the most important crops, viz., cotton. Hitherto the work of the deputy directors has been too diversified; it cannot be expected that they are competent to deal satisfactorily with fifteen to twenty different kinds of crops.

One mistake which is made in many of the provinces by

deputy directors is that they are experimenting with too many kinds of cotton. Seed is given out of about five or six different varieties, whilst it would be, in my opinion, more advantageous if the distribution of seed were confined to fewer kinds in each province. Where different seeds are given out each type should be confined to certain villages in order that the mixing of the different types may not be easy.

I was informed that the post of Inspector-General of Agriculture will shortly be abolished. I regret this, because through this official the various provincial departments have communicated and exchanged their experiences. It is intended that there should be more frequent congresses of agricultural experts, where they can discuss and exchange experiences gained, but I believe there should be at least one official in high authority who should permanently see to this extremely useful work. The travelling expenses in connection with these congresses will be exceedingly heavy. The item expended on travelling expenses alone for the last of these meetings would pay the salaries of a few permanent officials.

Wherever deep-rooted weeds, such as "Heriali," exist, the Agricultural Department ought to provide deep-working ploughs, either driven by steam or worked by bullocks, such as described in connection with the work of the Agricultural Department in Bombay. These ploughs should be hired out at a low rate to the farmers. This is a very practical kind of work which the Department of Agriculture or some other governing body might very usefully undertake. An important extension of the cultivable area would necessarily follow.

The Government ought to realize that, India being the second largest supplier of cotton in the world, it does not spend anything like a proper proportion of the amount which the principal cotton supplying country, the United States of America, annually spends in increasing and improving its cotton crop. India spends Rs. 423,723 in the Imperial Department of Agriculture and the eight Provincial Departments spend Rs. 2,631,-218, together Rs. 3,055,000 or about £200,000. The United

States Government appropriates for the Department of Agriculture $17,000,000 or about £3,500,000; in addition to this each American State makes a large appropriation from its own revenue. There can be little doubt that of the two countries more should be expected from the Government in a country where the cultivators are not yet so advanced as in the United States, and where the climatic and soil conditions are much more varied.

SEED FARMS.

The system adopted by the Central Provinces of having two or more "nucleus" seed farms owned by the Government and a large number of smaller seed farms owned by intelligent cultivators, spread all over the province, is to my mind the most essential means for improving the staple and of increasing the yield. Such seed farms are especially required in the Bombay Presidency, in the Punjab, and the United Provinces. They are, as experience has shown, no expense to the Government, whilst they act perhaps more beneficially than the experimental farms run by the Agricultural Department. The "nucleus" seed farms would help to reduce the cost of the experimental farms.

THE POSSIBILITIES OF THE INDIAN COTTON CROP.

There is not the least doubt that the cotton crop of India can be doubled without even interfering with the growing of food supplies. This is the opinion of many experts I interviewed, notably that of the Imperial Cotton Specialist of India, who, perhaps, is the highest technical. In his opinion the yield per acre has already increased. and is gradually improving; this is the result of his personal observation of the cotton fields during more than twenty years.

The extension of irrigation in several Provinces which is making rapid progress is another means of enlarging the area under cotton, and notably of the long stapled cotton. Government should be asked when allotting new land along the irrigation

canals in the Cotton Provinces to make a stipulation in the lease that a certain proportion of it should be planted under cotton in accordance with the recommendations of the Department of Agriculture of the respective Provinces. The seed for that land should be supplied against payment from the Government seed farm; such allotments will then be demonstration farms and act as a stimulus to all the surrounding districts. There will be no cost in connection with this except the supervising of the work, which can be entrusted to superior natives.

Such stipulation has already been made and has been willingly accepted by farmers along the Jamrao Canal in Sind as regards the cultivation of Egyptian cotton, and in the Punjab the Government are insisting upon farmers who have received new land rearing a number of horses, mules, and camels. There is such a large demand for this land that there will be no great difficulty in getting people to accept that stipulation, which, moreover, would not be a hardship but simply a means of convincing the cultivators of the advisability of cultivating cotton on the proper lines.

Along these canals Government ought to reserve plots of 200 to 400 acres for seed farms.

In view of the recent purchases of cotton land by several large cotton spinning concerns in America and Africa, I consider it my duty to inquire whether the Indian Government would welcome a purchase by Europeans of new cotton land along, say, the Montgomery canal. The reply received was that "it is premature to say whether such a grant could be given, as the scheme for colonization on the Lower Bari Doab Canal has not yet been worked out by the local Government, but that if any definite proposal is laid before the Government of India it will receive their careful consideration."

Several Anglo-Indians informed me that the policy of the Indian Government was not to encourage the acquisition of land by Europeans in India.

Other industries, especially the sugar industry, are making every effort to increase the cultivation of their respective raw

materials in India, and the cotton spinner must undertake the same steps if he does not wish to see the area which is used at present under cotton encroached upon by other produce.

REPLY TO LORD MORLEY'S STATEMENT.

When the deputation of Indian and Lancashire cotton spinners waited upon Viscount MORLEY, then Secretary of State for India, on July 27, 1910, he made the following statement:—

"If more cotton growing means that less wheat is to be grown and less of other food crops, then, of course, the price of food will rise and the difficulties of the Government, which are not inconsiderable already, will be increased."

I discussed this question with almost every educated agriculturist I met in India, and the following lines summarise the opinions expressed by these gentlemen: —

A famine is caused through failure or shortage of rains. Cotton is sown on all unirrigated land in India after the first rainfall, therefore it would be impossible to grow cotton on an extended area during a season with no rain or very little rain.

The farmer before deciding on the area he will sow with cotton first allots sufficient land for the production of his and his family's food supply. The surplus of foodstuff grown by cultivators serves to feed people in the nearest cities, and in some cases is for exportation. Even during famine years India exports foodstuffs, consequently an ample supply could be transported to famine-stricken districts if the cultivator had sufficient money. He can be put into possession of money solely by cultivating remunerative crops, of which cotton is certainly one.

The population in the cities of cotton growing districts gain their livelihood by handling cotton, and with an increased production of cotton their income, too, increases, and thus they would be better enabled to purchase their food from other Indian provinces. It must in this connection be remembered that certain large tracts in India must confine themselves, owing to natural conditions, to the growing of foodstuffs alone. Generally

speaking, there is a needed specialization in Indian agriculture Cotton, being a very remunerative crop, ought to be given the first place in suitable districts. India is more than self-contained, and it is therefore merely a question of which crop pays best in a certain district.

Furthermore, a famine cannot be caused through any extension of the cotton area in suitable tracts, as it is impossible to grow year after year cotton on the same piece of land. Cotton must be grown in rotation with some other crop, and as the most suitable rotation crops for cotton are Jowar (millet) and wheat, the farmer must at all times have a portion of his land under these crops.

The opinion is generally held that if the cultivator has the money he need not starve, as somewhere in India more than ample food supply is grown, and good means of transport exist all over the vast continent. The only difficulty exists in the case of bulky fodder, but there the necessary crop rotation assists. It is the Government's duty to induce the farmer to grow that crop which is suitable to his district and is most remunerative. It should also see that he grows it in the most judicious manner.

Resolutions on Cotton Growing in India.

UNANIMOUSLY ADOPTED AT THE MEETING OF THE COMMITTEE OF THE INTERNATIONAL FEDERATION OF MASTER COTTON SPINNERS' AND MANUFACTURERS' ASSOCIATIONS, HELD AT SALZBURG, MAY 13, 14, 1912.

Damping of Cotton.

This Committee respectfully invites the attention of the Secretary of State and of the Government of India to the practice adopted in some parts of India by cotton-pressing companies of artificially damping cotton, and solicits the introduction of legislative measures which will prevent the systematic watering of cottons in cotton ginneries or pressing factories, or in any place set apart for the artificial damping of cotton.

Additional European Agricultural Staff.

This Committee expresses its high appreciation of the work undertaken by the various Agricultural Departments in India, and respectfully urges on the Secretary of State the absolute necessity of strengthening the European staff in every Province if the measures for the extension of cotton cultivation that have been introduced are to be given any prospect of success.

Statistical Returns.

This Committee desires to call attention to the system in force in the United States of America, which provides for a statistical return of the number of bales of cotton pressed, the desirability of which was approved by the Sixth International Cotton Congress at Brussels, and which was urged upon the Secretary of State by a deputation of millowners from India and England. In the opinion of this meeting, the Secretary of State and the Government of India should be urged to institute a statistical return on similar lines in India.

Improved Staple Cotton.

This Committee expresses its high satisfaction with the qualities of Cambodia cotton grown in the South of India and of American cotton grown in Sind and the Punjab, and urges the Government of India to direct the Agricultural Departments to give the utmost attention to the cultivation of these kinds of cotton and introduce measures by which in the early stages of cultivation the Agricultural Departments will be enabled to grant remunerative prices to cultivators for their out-turns of improved staples up to the time marketable quantities can be produced.

New Cotton Land.

In the opinion of this Committee new land in any cotton-growing Province, along irrigation canals that are being completed, should only be leased to tenants with the stipulation that a certain portion of each holding should be cultivated with cotton under the direction of their respective Agricultural Departments.

Seed Farms.

The meeting respectively requests the Government of India to establish a system of seed farms in all the cotton-growing Provinces of India on the lines of those instituted by the Central Provinces' Department of

Agriculture, which have been an unqualified success, as it is of opinion that only by such a system of seed farms, distributed all over the Provinces, can suitable strains of cotton be kept pure. That such seed farms are, in addition, most valuable for purposes of practical demonstration, and are capable of being worked, if properly managed, free of cost to the Government.

Mixing of Cotton.

This Committee respectfully draws the attention of the Government of India to the fraudulent practices of mixing waste with cotton, and also mixing inferior grades in some cotton ginneries. They are advised this adulteration takes place quite openly, and that the waste and inferior cotton are frequently brought long distances by railway. The Committee suggests that possibly steps could be taken by Executive Officers to check these practices.

APPENDIX.

NOTE ON THE WORK OF THE AGRICULTURAL DEPARTMENT IN THE UNITED PROVINCES (INDIA) IN CONNECTION WITH THE CULTIVATION OF COTTON.

S. M. JOHNSON, Cawnpore, India.

The gross area of the United Provinces and Oudh as shown in statistical tables published by Government is about 61⅛ million acres. Of this area there are on an average 2⅜ million acres under forests; 9⅜ million acres are occupied by townships, villages, canals, railways, etc., and 35⅜ million acres are cultivated, leaving 10⅛ million acres of culturable waste and 3⅛ million acres of current fallows.

2. Of the 35⅜ million acres of cultivated land, about 5⅜ millions are cropped twice, giving a total of about 41,000,000 acres. Of this area 36,000,000 acres are under food crops and 5,000,000 acres are under non-food crops; and the latter 1⅜ million acres are on an average under cotton.

3. Of the 36,000,000 acres under food crops nearly 9,000,000 are irrigated, and of the 1⅜ million acres under cotton about one-third are irrigated.

4. Of the land under cotton nearly the whole area is comprised within the four divisions of Meerut, Agra, Rohilkhund, and Allahabad in the Provinces of Agra; the land under cotton in the Province of Oudh (which consists of the Lucknow and Fyzabad Divisions), being only 50,000 acres.

5. The above figures show generally that the Eastern Districts of the United Provinces are unsuited to the growth of cotton;

there being 9,000,000 acres under other crops than cotton in the Province of Oudh with only 50,000 acres under cotton, while in the Province of Agra, 25,000,000 acres are under other crops and $1\frac{2}{5}$ million under cotton.

ESTABLISHMENT.

The Department that has the supervision of these 61,000,000 acres is the Department of Land Records and Agriculture. It is divided into two branches, viz.:—

1. Land records;
2. Agriculture;

with one supreme head controlling both branches, viz., The Director of Lands Records and Agriculture.

2. The director has under him one deputy director for the Land Records Branch, but as this branch, with its large staff of Putwaris and Kanungos, has nothing to do with the present investigation, no further reference will be made to it.

3. The Second Branch, viz., Agriculture, is under the same supreme head as the Land Records Branch, but is sub-divided into three sections, as follows:—

1. Agricultural College;
2. Research;
3. Practical Agriculture;

each being immediately subordinate to the supreme head, the director.

4. The staff of the control of these sections is as follows:—

College. A principal.
Research. A botanist and assistant botanist, and a chemist.
Practical. Two deputy directors and one assistant director.

5. With the college these notes have no concern. In the Research Branch, the Botanist, Mr. MARTIN LEAKE, is almost entirely engaged in researches into the growth of the cotton

plant; sorting out and growing pure strains; crossing pure strains, and generally endeavouring to obtain a plant suited to the conditions of cultivation in the United Provinces and possessing a lint of superior quality and heavy production. The results of his work will be referred to later on in these notes.

6. For administrative purposes the practical branch of the Agricultural Department is divided into three circles, each directly under the supreme head, viz., the director. The three circles are:—

The Western Circle.
The Central Circle.
The Eastern Circle.

7. The two former are each under a deputy director, and the latter under an assistant director. The western and central circles being practically the only cotton growing circles, there will be no further reference to the eastern circle.

8. In the western circle, Dr. PARR is the deputy director in charge, and in the central circle, Mr. BURT. These two officers have entire charge of all agricultural operations and experiments in their respective circles under the immediate orders of the director.

9. I have so far indicated the land areas in the United Provinces and the areas under food crops, non-food crops, and cotton respectively, and will now treat of the practical part of my investigation.

COTTON SEED FARMS.

There are no cotton seed farms anywhere in the United Provinces. By seed farm is meant land set apart by Government and maintained by it for the cultivation of any desired quality of cotton, and the ultimate distribution of the seed so obtained among cultivators. I am informed that Government has recently acquired 200 acres of land as an experimental farm at Allygur which will be under the charge of Mr. MARTIN LEAKE, for the cultivation of the particular cotton he has been

experimenting upon. This grant is one for which all interested in cotton should be thankful, as being at last a step in the right direction, and if the particular cotton that is now to be experimented with there is not a success the land and organization will be ready for the reception of other varieties. It must be remembered that the success or failure of any particular variety takes at least one year to ascertain, and that progress must necessarily be slow. A cotton cannot be recommended to the cultivator by the Agricultural Department until it has been proved to be a success by that department, for failure would be disastrous.

EXPERIMENTAL FARMS.

There is land set apart by Government in Cawnpore (about 80 acres) and in Allygur (about 90 acres) which has been for many years used as experimental farms for cotton as well as other products, such as wheat, sugar-cane, ground nuts, maize, juar, gram, etc.

2. The Cawnpore experiments have been conducted with varieties of Desi cotton and with American cotton. The last description was experimented with for many years, but apparently never got to the stage of being passed as fit for propagation of seed for wholesale cultivation, and was finally abandoned three or four years ago. Since then experiments have been, and are being conducted with other varieties of cotton.

3. The indigenous cottons of the United Provinces consist of many types, but they are all said to be of a single species. The simplest classification for the purpose of my notes is, I think, that which divides them into:—

White Flowers;
Yellow Flowers;
Red Flowers.

4. White and yellow flowered cottons are found quite commonly in the fields, though yellow largely predominates, and it is from these that the Desi cotton of commerce is obtained in

these Provinces. The red flower plant is an isolated type and is only found in the vicinity of temples; it has the longest staple of any of the indigenous cottons, but it is a late flowering plant, and the reason for its not being grown as a field crop is because this habit makes it a non-remunerative crop to the cultivator.

5. Since the abandonment of the American cotton, Mr. LEAKE has been engaged, as already stated, in cultivating pure strains of the white and yellow flowered cottons, and establishing crosses between them and the red flower and other types from other parts of India. The most successful has been with—

(*a*) White flower and red;
(*b*) Yellow flower and red.

The cross (*a*) has a lint which is somewhat coarse though long, while (*b*) is silky. Neither of these crosses has yet stood the test of field conditions, but the 200 acres which Government has acquired at Allygur, and which I have already referred to, have been placed at Mr. LEAKE'S disposal specially for trial under field conditions of the crosses (*a*) and (*b*).

6. At Allygur experiments on very similar lines have been carried on: in that direction distribution of American seed was made on a fairly large scale, but the attempt to establish it ended in failure, and I understand the cultivators in this district will have nothing to do with acclimatized American seed, so that in this district also experiments with American seed have been a failure and have been abandoned.

7. Experiments in Allygur as in Cawnpore have also been carried on with other descriptions of cotton, and the deputy director there, Dr. PARR, in the course of his experiments found in two villages the white flowered types of cotton (ante) which the cultivators in these two villages had preserved as a pure strain because it was a more abundant producer than the common Desi in other villages.

8. Dr. PARR accordingly took up this particular cotton and experimented with it; these experiments have been carried on for three years, the method followed being to distribute seed from

the farm and elsewhere to picked cultivators in the surrounding villages, offering to compensate in the event of failure, watching progress, and buying back the seed resulting from the ensuing growth.

9. The results of these experiments are that in the season just ended Dr. PARR has been able to collect about 250 maunds of seed; this seed will now be sold to cultivators (who now clamour for it), and the next growing season (June to September, 1912), it is hoped there will be fully 3,000 acres in Allygur District under White Flower. Dr. PARR proposes collecting as much of this seed as possible again next year, so as to preserve the pure strain, and again distributing it; he hopes there will be at least 30,000 acres under White Flower in the season 1913.

DEMONSTRATION FARMS.

1. There are no demonstration farms especially so-called in these provinces.

2. Mr. SCHMIDT, the Secretary of the International Spinners' Federation, appeared to attach importance to them, but experimental farms might also be called demonstration farms, since they are available in common with any other farms for demonstration purposes. Besides, any field in the vicinity of a village could be made use of for demonstration purposes, so that there appears to be no need at all to set aside special lands as demonstration farms.

GENERAL.

1. It will be seen from the foregoing that the only lands available for experiments in cotton growing are the areas at Cawnpore and Allygur; that these lands comprise many other products and are not by any means confined to cotton; and that there are no seed farms at all.

2. The cause of this state of affairs was no doubt due to the fact that when the experiments with American cotton were finally abandoned the Department has nothing to fall back upon; it then became necessary to discover some cotton which might

eventually be found to be better than the ordinary Desi plant found in the fields.

3. Long before American cotton was abandoned as a failure in these provinces the opinion of experts and of the Upper India Chamber of Commerce was that the only hope of success lay in improving indigenous cottons and this advice pressed upon the Government in season and out of season has at last come to be found sound and correct and is now followed.

4. The cottons Mr. LEAKE and Dr. PARR are now engaged upon are purely indigenous types; the crosses Mr. LEAKE has cultivated and Dr. PARR'S White Flower promise a cotton far superior to the present Desi in all desirable characteristics, the main ones being that it picks clean and produces a ginning percentage of nearly 40 against about 33 of the ordinary Desi, and that it has a longer staple.

METHODS SUGGESTED FOR THE IMPROVEMENT OF COTTON CULTIVATION IN THE UNITED PROVINCES.

1. It has been shown that there are only 80 acres in Cawnpore and 90 acres in Allygur used as farms in these provinces for every variety of product, and further land to the extent of 200 acres at Allygur is to be acquired.

2. But this is not enough; Government should have a properly equipped farm in each of the great cotton growing districts; and as a season lost means at least a delay of one year, endeavors should be made to have these farms equipped and ready before the rainy season of 1913.

3. I understand land for a farm of about 100 acres could be acquired and equipped with all the necessary appurtenances, cattle, huts, houses, etc., for under 40,000 Rs. Only about 30 acres of this would be available for cotton, as the latter could only be sown in rotation with other crops.

4. These farms would always be self-supporting, and would always yield Government a fair return on the capital spent. Moreover, practically the whole of the capital would always be realizable as, if or when relinquished, the land could always be sold again.

5. It appears to me there ought to be at least five additional farms acquired and equipped this year. One has already been sanctioned at Allygur; there should be another at Cawnpore, one at Meerut, one at Agra, and one at or near Kulpahar, in Bundelkhand.

6. The farms at Cawnpore and Kulpahar would be experimental farms at first; the former to experiment with the White Flowered cotton and the latter to experiment with Kulpahar cotton, which is a superior cotton to the ordinary Desi and fetches a higher price.

7. Agra and Meerut would be seed farms to propagate the seed of the White Flower already established in the district, while the additional farm at Allygur would be for Mr. LEAKE'S crosses. Should Mr. LEAKE'S cotton be found satisfactory under the tests that are about to be applied then these would supplant the White Flower as being a superior cotton.

8. In his reply to the deputation that waited on him in 1910, Lord MORLEY said that Government could not be expected to do anything which would diminish the area under food crops, but the risk in non-food crops, and particularly cotton, ever encroaching on the food crops of these provinces appears to be absolutely non-existent; 60 per cent. of the land in the United Provinces is under food crops, while only about 2.3 per cent. is under cotton.

9. I hear the Government contemplate reviving the cultivation of American cotton. I think we must all hope that there is no truth in the rumor. The history of the numerous and long-continued experiments with this cotton is too recent to be forgotten and is nothing but a record of many years lost; much money spent on which there has been no return, and failure and abandonment everywhere.

10. Endeavoring to grow American cotton in the United Provinces appears to me much as if one tried to breed race-horses in them — the necessity of continuously importing the pure strain in order to keep up the type would be so expensive as to put it entirely out of the reach of the cultivator, apart altogether from all other considerations.

11. Thirty years ago the Agricultural Department in these provinces tried experiments here in Cawnpore between New Orleans and Upland (both American) on the one hand, against Kulpahar (Bundelkhand) and common Desi on the other hand. The results went to show that the indigenous cotton was by far the most profitable. These were the results as reported by the Department itself, and in its own words.

12. As regards improved methods of cultivation it appears difficult to say anything in a country where, for instance, the best and latest ideas in ploughs which will turn over the soil to a depth of eight or nine inches are scornfully rejected in favour of one which merely scratches the surface. A great deal appears to depend on the cultivator himself; one individual will thin out weak looking plants and thus secure only vigorous growths, while another will allow all to grow up together; one will try and secure a pure strain (as in the villages in the Allygur District already referred to), while another leaves everything to fate.

STAFF.

Any extra farms that may be established must, I should think, be placed under the control of competent natives, of whom there are many, no doubt, available, but their supervision by a European officer with Western training would be essential, and I doubt if the existing staff of two deputy directors could carry on the extra duties.

2. The value of European officers coming into frequent contact with cultivators in surrounding villages; of personally knowing them, taking an interest in their fields and inculcating Western ideas, whether the former follow them or not, must be so enormous that any question of cost ought to be of no consideration. I was much impressed with the work done by Dr. PARR in Allygur. He is in close touch with all the villages that grow White Flowered cotton; he sells the seed to them and arranges for their Kuppas to be ginned and after selling the cotton he buys back the seed; this seed he again sells to selected cultivators and thus keeps the strain pure.

3. It is only by measures such as these that he is able to look forward to having 30,000 acres under White Flower in the season 1913.

BOMBAY COTTON TRADE ASSOCIATION, LIMITED. BY-LAWS.

1. The official year of the Association shall be from November 1st to October 31st, and the annual subscription shall be as follows, and must be paid to the Secretary not later than November 15th in each year.

2. No persons shall be admitted to the premises of the Association unless they are shareholders or ticket-holders under one of the following rules:

(*a*) Members shall consist of firms or companies whose representative is, or representatives are, shareholders in the Bombay Cotton Trade Association, Limited. Members shall pay a subscription of Rs. 100 per annum. This shall entitle them to have surveys held on their cotton and to receive six entrance tickets for their nominated employès, who shall be allowed to use the rooms, provided their names have been previously submitted to the Secretary and endorsed on the tickets.

(*b*) Associate Members. — Firms or persons who wish to become Associate Members, and so have the use of the rooms, and the right of having surveys held on their cotton, must send in an application (on a form to be obtained from the Secretary) to the Board of Directors, and provided their application is approved of by three of the Directors and the applicants pay a subscription of Rs. 50 per annum, they shall be considered duly elected as Associate Members for the official year, and shall be entitled to receive three entrance tickets for their nominated employès, who shall be allowed to use the rooms, provided their names have been previously submitted to the Secretary and endorsed on the tickets.

(*c*) Ticket-holders. — Persons who wish to become ticket-holders, and merely to have the use of the rooms (but not the right to have surveys held on their cotton), must send in an application (on a form to be obtained from the Secretary) to the Board of Directors, and provided their applications are approved of by three of the Directors and the applicants pay a subscription of Rs. 10 per annum, they shall be considered duly elected as ticket-holders for the official year and be entitled to receive one entrance ticket each to the rooms.

N. B. — All holders of tickets shall produce the same whenever required by officers of the Association.

3. Members may introduce strangers visiting Bombay to the premises of the Association.

RULES AND REGULATIONS FOR DELIVERIES, ARBITRATIONS AND SETTLEMENTS OF DISPUTES.

1. Appeal Committee. — The Appeal Committee (three to form a quorum) shall consist of the Board of Directors of the Association for the time being and three other Shareholders of the Association elected from time to time by the Board, but should the Members of the Appeal Committee present at any appeal consider it desirable to call in one or more Shareholders of the Association to assist them in deciding the appeal, they are hereby empowered to do so, and the Shareholder or Shareholders so appointed shall be Members of the Appeal Committee for that day only, and the award given either unanimously or by a majority of the Appeal Committee so constituted as aforesaid shall be the award of the Appeal Committee.

2. Quotation Committee. — The Board, shall, from time to time, appoint Daily Quotation Committees, consisting of three of the members of the Appeal Committee, for the purpose of registering the market rates of the different growths of cotton. Two to form a quorum.

3. Monthly Quotations. — The Directors shall meet on or about the 25th of each month for the purpose of fixing and registering the market rates of cotton for the purpose of contracts falling due on the 25th of the month.

4. Daily Quotations. — The rates so registered as aforesaid, either by the Board or the Daily Quotation Committees (in the latter case subject to the right of appeal to the Board of Directors on payment of the usual appeal fee of Rs. 50), shall be binding on all parties entering into contracts for sale or purchase of cotton according to the Rules of this Association

in settling disputes with reference to the market rate of the day.

5. Time for Arbitrations. — All arbitrations and appeals with reference to quality must be held in the rooms of the Association, and must be commenced not later than 5.30 P. M. (Standard Time), unless otherwise mutually agreed to. If, however, the lots of cotton tendered for arbitration on any one day are so numerous as to render it impossible for arbitrations to be commenced by 5.30 P. M. (Standard Time) on all the tenders from which samples have been drawn, either party interested shall have the right to postpone such arbitrations (on the same samples) till 5 P. M. (Standard Time) the following day. Such extension of time shall be regarded as an extension of the three days mentioned in Rule 18.

6. Arbitration Fees. — The fees of arbitrators appointed under Rule 12 shall be Rs. 10 each for the first 110 bales or less, each party to pay their own arbitrator; and in case of an umpire being called in, his fee shall be the same as the original arbitration fee and be borne by the arbitrators in equal shares.

7. The fees of arbitrators appointed under Rule 13 shall be not less than Rs. 25 each, and be paid by the party or parties for whom they act at the time of application for arbitration. In case of an umpire being called in, his fee shall be the same as the original arbitration fee and be borne by the arbitrators in equal shares.

8. Appeal Fees. — The charge for an appeal to the Board and/or the Appeal Committee shall be Rs. 50 (except as provided for in Rule 13) and must be paid to the Association at the time an application for an appeal is made.

9. In cases where arbitrations are held on samples sent from Japan, and either party shall be dissatisfied with the award, a right of appeal shall lie to the Appeal Committee, provided it be claimed within seven days after the day on which the arbitration was held, and provided also that the appellant pays the appeal fee on the following scale:

Not exceeding 300 bales,							Fee Rs.	50
Above 300 bales but not exceeding 500 bales,							"	"	75
"	500	"	"	"	750	"	"	"	100
"	750	"	"	"	1,000	"	"	"	125
"	1,000	"	"	"	1,500	"	"	"	150
"	1,500	"	"	"	2,000	"	"	"	175
2,000 or more,							"	"	200

And an award signed by at least three members of the Appeal Committee and countersigned by the Secretary shall be deemed to be the award of the Appeal Committee and shall in all cases be final. The arbitration samples shall be used for the purposes of the appeal unless otherwise mutually agreed upon by both parties.

If, however, both parties to the contract should agree to the appeal being held after expiry of the seven days named above, it shall be permissible to hold it at some future time, provided fresh samples are submitted to the Appeal Committee.

10. The Association shall collect all arbitration fees and pay the same to the arbitrators and umpires, less 10 per cent., which must be deducted and credited to the Association for general expenses. The Association shall, however, only be responsible for the fees which have actually been collected by their clerk.

(*a*) In case of appeals (regarding rates) under Rules 4 and 14, Rs. 20 of the fee shall be credited to the funds of the Association and the balance paid in equal shares to the Directors present at such appeals.

(*b*) In case of appeals (regarding quality) under Rules 12 and 18, Rs. 20 shall be credited to the funds of the Association and the balance paid in equal shares to the Members of the Appeal Committee who sign the award.

(*c*) In case of appeals (other than quality) under Rule 13, the whole of the fee shall be credited to the funds of the Association.

11. No member of the Association having any interest in a matter in dispute shall vote on the question of the appointment of arbitrators or umpires, and no such members shall be competent to sit on any arbitration or appeal.

11. Arbitrations regarding Quality. — All questions of disputes as to quality between buyer and seller shall be referred to the arbitration of two disinterested persons, being shareholders of the Company, one to be chosen by each disputant, such arbitrators having the power to call in a third arbitrator, who must also be a shareholder. The award made by such arbitrators or any two of them shall be final and binding, subject only to the right of appeal to the Appeal Committee.

13. Arbitrations other than Quality. — All questions of dispute between buyer and seller (other than that of quality) shall be referred to the arbitration of two disinterested persons being shareholders of the Association, one to be chosen by each disputant, such arbitrators having the power to call in a third arbitrator who must also be a shareholder. The award made by such arbitrators or any two of them shall be final and binding on both parties, subject only to the right of appeal to the Board on payment of Rs. 100. Should one of the disputing parties appoint an arbitrator, and the other refuse or neglect to do so for twenty-four hours after notice in writing of the appointment, or in case the arbitrators appointed shall not within seven days after their appointment, agree to award or appoint a third arbitrator, or after the appointment of such third arbitrator, in case of the death, refusal to act, or incapacity of any of such three arbitrators, or in event of two out of three arbitrators not agreeing, then upon application of either of the disputing parties, the question in dispute shall stand, referred to two arbitrators, to be nominated by the Chairman of the Company for the time being, or in case of his absence, illness, or interest in the matter of dispute, then by the Deputy Chairman, if not interested, and in case of the absence of the Chairman and Deputy Chairman, their illness or interest in the matter in dispute, then by the Board, and in case the two arbitrators so appointed, whether by the Chairman, the Deputy Chairman or the Board, shall not, within seven days after their appointment, agree to an award or choose a third arbitrator, then the Board shall appoint a third arbitrator and shall, in case

of the death, refusal to act, or incapacity of any of such three arbitrators, from time to time substitute a new arbitrator in the place of the arbitrator or arbitrators so dying, refusing or being incapacitated. The arbitrators in all cases shall be shareholders of the Company. The award of any two arbitrators appointed under this rule shall be final and binding on both parties, subject only to the right of appeal to the Board on payment of Rs. 100.

14. Insolvency. — If before the maturity of any contract either party shall become insolvent or bankrupt, such party shall be deemed to be unable to fulfil the contract and the other party shall forthwith buy or sell, as the case may be, in the market at a reasonable rate on the account of the insolvent or bankrupt party, and shall be entitled to receive from or shall pay to him as the case may be, the difference (if any) between the re-purchase or re-sale price and the rate named in the contract. Provided always that if there is any dispute as to the reasonableness or otherwise of the price paid by the solvent party, when buying or selling in the market on account of the insolvent or bankrupt party, such dispute shall be referred to arbitration under Rule 13.

15. Delivery Order Form. — All delivery orders must be in conformity with the form as printed on page 138, which shall be known as the "Bombay Cotton Trade Association Ltd.'s Official Delivery Order Form," and any delivery order which is not issued on such form shall not be deemed to be a valid delivery order within the meaning of, or acceptable under these Rules.

16. In every contract made under these Rules the purchaser shall be deemed (subject to the provisions of Rule 22) to have agreed to accept in fulfilment of such contract any cotton which may be passed, either without an allowance, or, with an allowance awarded on arbitration or appeal under Rule 12.

17. All cotton contracted for, for forward delivery, shall be ready and delivery order for the same (as provided in Rule 15) shall be tendered by 1 P. M. (Standard Time), on the latest

date for delivery specified in the contract. In case a delivery order for the cotton or any portion of it is not so tendered, or in case the cotton or any portion of it for which a delivery order has been passed is not actually then ready in Colaba on the Jaitha or in the godown for delivery, the buyer may (1) cancel the contract, or (2) buy in the market on the same day at a reasonable rate on account, and at the risk and expense of the seller, or (3) claim damages at the market rate of the day, *vide* (Rule 29); provided always that in the event of the buyer exercising the option of buying in the market, and there being any dispute as to the reasonableness or otherwise of the price paid by him, such dispute shall be referred to arbitration as provided by Rule 13. If on the other hand the seller has tendered the cotton within the time specified in the contract, as provided for above, and if the buyer neglects or refuses to either approve of, or have arbitration held on the cotton so tendered, as provided in Rule 18 hereafter, the seller, after giving 48 hours' notice to weigh after the expiration of the time allowed for arbitration, has the option of either selling the goods at the risk and expense of the buyer, or claiming damages at the market rate of the day.

(*a*) In contracts where it is not stated whether the cotton is to be machine-ginned or hand-ginned description, the seller shall have the right of tendering either machine-ginned or hand-ginned cotton or an admixture of both, provided always that the lot tendered be of one description.

(*b*) Against contracts on Rail Delivery Terms, if a delivery order is tendered the sampling for arbitration or approval and weighment of such cotton shall be done in the seller's Jaitha or godown, and the buyer shall cart it from there at his own expense. In such cases no muccadum allowance shall be payable by the seller, unless it is so specified in the contract.

(*c*) Against contracts for Khamgaon and, or Akola, only cotton pressed at either of these places constitutes a fair tender, provided it is of the description sold.

(*d*) Against contracts for "Oomra, Fair Staple," only cotton

pressed at the following places constitutes a fair tender, provided it is of the description sold :— Thirteen towns named.

(*e*) Against contracts for Bengals, only cotton pressed at the following places constitutes a fair tender, provided it is of the description sold :— Seventy-eight towns named.

And all Rajputana descriptions, as defined in Rule 17 (*g*).

(*f*) Against contracts for Sind Punjab descriptions, only cotton pressed at the following places constitutes a fair tender, provided it is of the description sold :—Seventy-seven towns named.

(*g*) Against contracts for Rajputana descriptions, only cotton pressed at the following places constitutes a fair tender, provided it is of the description sold :—Twenty-one towns named.

18. The seller when issuing a delivery order must insert in it the price at which he requires payment and the day on which the right to hold an arbitration on the cotton will expire; no delivery order shall be issued unless at the time of the issue of such order the cotton is actually ready in Colaba, either on the Bunder or Jaitha, or in the godown; if there should be a greater number of bales on the Bunder or Jaitha or in the godown of the mark tendered than the number specified in the delivery order, the buyer shall have the right to demand that the bales tendered to him be indicated specially by a distinguishing mark before sampling, but the buyer shall not have the right to object to the tender for the sole reason that the bales tendered have not been separated from other bales of the same mark.

To constitute a valid tender under these rules the bales tendered must all be in one Jaitha or godown.

A delivery order can be passed on against a contract, but no person is bound to accept a delivery order before 10.30 A. M. (Standard Time), or after 3 P. M., (Standard Time), or after 1 P. M., (Standard Time) on the day on which the right to hold an arbitration expires, or after 1 P. M., (Standard Time) on the latest date for delivery specified in the contract.

The arbitration (if any) must be held not later than three days after the date of the delivery order, and if it is not held

within that time, the cotton must be taken by the buyer without arbitration.

In the event of the seller refusing or neglecting to have the arbitration held before the expiration of the three days as provided for above, the buyer shall have the right to have an ex-parte arbitration held, and the award in such arbitration shall be binding upon both parties subject to the usual right of appeal.

N. B. Notice in writing, calling for an arbitration, is not necessary.

19. For purposes of inspection, the buyer shall have the option of opening 5 per cent. of bales at the buyer's expense, in case the cotton passes without arbitration being called for, or if passed by the arbitrators.

20. For the purposes of arbitration 10 per cent. of bales may be opened (3 per cent. of which may be opened outright), and such bales shall be re-pressed at the cost of the losing party (say, at Rs. 2 per bale). The samples are to be drawn conjointly by parties representing buyers and sellers from both sides of the bales, the buyers selecting the bales to be opened; and all samples drawn shall be used for determining the questions of either "false packing" or "quality," but due allowance shall be made for the change in the appearance of the hard side of the bale owing to cross packing.

21. Should part only of a lot be tendered and such part be arbitrated upon, such arbitration shall refer only to the part, and the balance of the lot shall be considered as a separate lot for arbitration. If the contract be for only 110 bales or less, only one tender shall be made; if for more and in multiples of 100 bales, the tender shall be made in multiples of 100 bales, and if the contract be in multiples of 110 bales the tender also shall be made in multiples of 110 bales.

22. If the final award for inferiority of quality be in excess of Rs. 5 per candy (unless as provided for in exception (*a*) to this rule), or if the lot tendered be found to be a full grade below the quality contracted for, or to be fraudulently packed

or damaged, the buyer shall have the option either to take the cotton at the allowance fixed by the arbitrators or the Appeal Committee, or upon giving notice in writing to the seller and original tenderer to refuse the same, in which latter case he may either buy in the market at a reasonable rate on account, risk and expense of the seller, or invoice it back to the seller at the market rate of the day upon which the final award shall have been made, provided always that in the event of the buyer exercising the option of buying in the market, he shall do so not later than the day following that on which the arbitration and/or appeal (if any) is finally disposed of, and if there be any dispute as to the reasonableness or otherwise of the price paid by him, such dispute shall be referred to arbitration as provided by Rule 13. The term "Full Grade" shall be understood to mean the difference between "fine" and "fully good" and other similar differences. If, however, when a lot of cotton is tendered before the due date of the contract, the quality of the cotton should be objected to by the buyer, the seller shall be allowed to withdraw the tender and make a new tender within the contract time, provided no arbitration has been held on the cotton; but no withdrawal of any tender shall be allowed after an arbitration has been held.

Exception (*a*) Where the difference between the market rates for the grade contracted for, and for the full grade next below exceeds Rs. 10, the cotton must be taken by the buyer unless more than half grade off.

23. In case either party shall be dissatisfied with the award under Rule 18, a right of appeal shall lie to the Appeal Committee, provided it be claimed before 1 P. M. (Standard Time) on the day after the day on which the arbitration has been held, and provided also that the appellant pays the usual appeal fee of Rs. 50, and an award made and signed by at least three members of the Appeal Committee and countersigned by the Secretary shall be deemed to be the award of the Appeal Committee and shall in all cases be final.

24. In cases where the buyer elects to reject, notice in

writing to that effect shall be given to the seller and original tenderer not later than 1 P. M. (Standard Time) on the day after the day on which the arbitration has been held, and the seller in such cases shall have the right to appeal up to 3 P. M. (Standard Time) on the same day, and the contract or contracts or the subject matter of the contract should be lodged with the Secretary for the guidance of the Appeal Committee.

(*a*) In cases where the buyer elects to reject (after an appeal), notice in writing to that effect shall be given to the seller and the original tenderer not later than 1 P. M. (Standard Time) on the day following that on which the appeal is finally disposed of.

25. The buyer shall in all cases begin to take delivery of the cotton not later than the day after the cotton is finally approved of, and shall continue to do so at the rate of not less than 300 bales per day. In default the seller may, after forty-eight hours' notice, weigh over the cotton at the expense and risk of the buyer, who shall then pay for it with interest at 9 per cent. per annum and 8 annas a bale for charges, failing which the seller shall have the power of re-sale for account and risk of the buyer. The seller shall not be held responsible for damage by rain water caused after the approval of the cotton if the same be not weighed over within seventy-two hours after final approval.

26. The last buyer must pay for the cotton at the rate at which the delivery order was originally issued, and for the actual weight delivered; but for the purposes of settlement and for the adjustment of accounts between intermediate parties on delivery orders passed on, the weight of all bales referred to in these rules shall be considered to be 3½ cwts. net per bale, and the sums due on such settlements and adjustment of accounts shall become payable when the cotton is finally passed.

Any settlement or adjustment of accounts under this rule shall not be deemed to prejudice any other right which parties may have in respect of their contracts.

27. In contracts for full-pressed bales, the buyers shall have

the option of rejecting burst or re-pressed bales over 2 per cent. beyond those opened for inspection or arbitration. But the term "re-pressed" shall not be held to include bales which have only had the centre hoops refixed.

28. When the due date falls on Sunday or on the following holidays, viz., Good Friday, Christmas Day, New Year's Day, and the day fixed by the Governor-General in Council for the observance of the King's Birthday in India, it shall be considered as falling on the previous day; nor shall Sunday or any of the days as mentioned above be computed as forming any portion of the time allowed for any purpose under these rules.

The directors may, at their discretion, by a resolution passed by the Board of Directors of the Association, close the room of the Association at Colaba, on any day or days other than those above-mentioned, but any day or days on which the rooms are so closed as aforesaid, shall not affect the due date of contracts nor the time in which notice for "Appeal" or "Rejection" must be given under Rules 23, 24 and 25 (a), but such day or days on which the rooms are so closed as aforesaid, shall not be computed in the time allowed for arbitration under Rule 18.

29. For the purposes of these rules the expression "the market rate of the day" shall be taken to mean the rate quoted by the Daily Quotation Committee of the Association, subject to the right of Appeal to the Board of Directors on payment of the usual Appeal fee of Rs. 50 or in the absence of any such quotation that quoted by the Board of Directors.

30. The official quotations issued by the Bombay Cotton Trade Association, Limited, are "Jaitha Terms," *i. e.*, inclusive of 8 annas per bale muccadum allowance for all descriptions of cotton excepting Bengals and Sind, for which descriptions the rates quoted for "Delivery Contracts" and "Railway Terms" and for ready purchases "Jaith Terms."

31. Claims for excess measurement for all descriptions of cotton must be sent in not later than six weeks after the complete lot has been received by the buyer.

32. For the purpose of enforcing any award by attachment or otherwise, these rules and any contract referring thereto and the memorandum of the appointment of the arbitrators, may be made a rule of the High Court of Judicature of Bombay.

33. The foregoing rules shall be applicable to all contracts made under the rules and regulations of this Association on and after May 1, 1911.

Note.—At an extraordinary general meeting of the shareholders, held on May 27, 1909, it was resolved that the contract form (copy of which will be found on page 338) be adopted and recognized as the Official Contract Form of the Bombay Cotton Trade Association, Limited.

Form of notice recommended to be used under rule 22: —

Sir,—I beg to give you notice that I refuse to take the cotton tendered by you in fulfilment of the contract of which particulars are given below under the provisions of Rule 22 of the Bombay Cotton Trade Association Rules.

Yours truly,

Dated,

Particulars of contract.

RULES REGARDING MEASURING COTTON AT JAITHAS AND/OR GODOWNS IN COLABA.

Members and associate members requiring bales of Bengal or Sind cotton measured at their Jaithas or Godowns at Colaba must send the fee and give notice in writing to the Secretary of the Bombay Cotton Trade Association, Limited, stating: —

1. Marks and number of bales.
2. Where the bales are stored.
3. The latest date on which they require the bales measured.

The secretary of the Association, on receipt of the fee and application, will arrange with the secretary of the Chamber of Commerce for a measurer to attend at the place named as soon as possible after receipt of the application.

The fee for measuring will be the usual one, viz., three pies per bale of each lot for which the average measurement is certified.

At least 5 per cent. of each lot will be measured (the bales being selected by the measurer), and a certificate of the average measurement will be given to the applicant.

The rate of freight on which the claims for extra measurement are based will be fixed by the directors at their monthly meetings, and will be applicable for all claims made during the following month on cotton measured in the Jaithas and/or Godowns under these rules.

N. B.—The secretary of the Chamber of Commerce hopes to be able to arrange for a measurer to attend on the day after the receipt of the application, but in order to facilitate the working of the scheme, firms are requested to give as long a notice as possible, and, when possible, to avoid asking for their bales to be measured at the end of the month, when the work of measuring bales at the Bunders and docks is generally much heavier than it is earlier in the month.

RESOLUTION ADOPTED AT DIRECTORS' MEETING HELD ON NOVEMBER 12, 1906.

Rule 26 of the Bombay Cotton Trade Association, Ltd, applies to adjustment of accounts between intermediate parties on delivery orders passed on, but does not apply to cases where railway receipts are passed on.

In cases where a railway receipt is passed on against a contract, Rule 26 does not apply, and as each seller receives 90 per cent. of his contract price in exchange for the railway receipt, there is only a small difference to adjust between intermediate parties, and this must be settled on actual weight delivered.

In cases where a delivery order is passed on against a contract, Rule 26 applies, and the differences due between intermediate parties must, under this rule, be settled on the bases of 3½ cwt.

net per bale, and such differences become due when the cotton tendered has been finally passed.

Original.

OFFICIAL DELIVERY ORDER FORM OF THE

BOMBAY COTTON TRADE ASSOCIATION, LTD.

No. . . . . Bombay, ... 191 .
Time for arbitration expires on . . . . . 191 .
To
. . . . . .
. . . . . .
Please deliver to . . . . . .
. . . . . Bales of . . . . Cotton
Sold as . . . . . .
as specified below, lying in . . . . . .
and take a receipt for the same.
Against Contract No. . . . . , dated . . . . . .

Mark.	Bales.	Price.	Terms.

Signature . . . . . .

10 pounds per 100 bales allowed for samples.

OFFICIAL DELIVERY ORDER FORM.

ENDORSEMENTS.

Please deliver to . . . . . .
Against Contract dated . . . . . at Rs. . . . . Terms
Signature, ...
Date . . . .

Please deliver to . . . . . .
Against Contract dated . . . . . at Rs. . . . . Terms
Signature, ...
Date . . . .

Please deliver to . . . . . .
Against Contract dated . . . . . at Rs. . . . . Terms
Signature, ...
Date . . . .

Please deliver to . . . . . .
Against Contract dated . . . . . at Rs. . . . . Terms
Signature, ...
Date . . . .

Please deliver to . . . . . .
Against Contract dated . . . . . at Rs. . . . . Terms
Signature, ...
Date . . . .

No. . . . . .

MEMO. OF CONTRACT.

From . . . . . .

To Messrs. . . . . .

We have this day bought by your order and for your account subject to the rules and regulations of the Bombay Cotton Trade Association, Ltd.

From Messrs. . . . . .

. . . . . (. . . . .) Bales
of . . . . . Cotton
at Rs. . . . . per Candy, less 5½% Discount
delivered in Bombay in full pressed bales.
Measurements . . . . . tons per 100 Bales
Delivered from . . . . . to . . . . . at seller's option.
The quality to be . . . . . .
Terms . . . . . .
Remarks.

RULE 16, BOMBAY COTTON TRADE ASSOCIATION, LIMITED.

In every contract made under these rules the purchaser shall be deemed (subject to the provisions of Rule 22) to have agreed to accept in fulfilment of such contract any cotton which may be passed either without an allowance awarded on arbitration or appeal under Rule 12.

Bombay, ... 191 .
Brokers.

Seller's Signature . . . . . .

Official Contract Form of the Bombay Cotton Trade Association, Ltd.

No. . . . . .

MEMO. OF CONTRACT.

From . . . . . .

To Messrs. . . . . .

We have this day sold by your order and for your account subject to the rules and regulations of the Bombay Cotton Trade Association, Ltd.

To Messrs. . . . . .

. . . . . (. . . . .) Bales
of . . . . . Cotton
at Rs. . . . . per Candy, less 5½% Discount
delivered in Bombay in full pressed bales.
Measurement . . . . . tons per 100 Bales
Delivered from . . . . . to . . . . . seller's option.
The quality to be . . . . . .
Terms . . . . . .
Brokerage ½% to be paid to the seller.
Remarks.

RULE 16, BOMBAY COTTON TRADE ASSOCIATION, LIMITED.

In every contract made under these rules the purchaser shall be deemed (subject to the provisions of Rule 22) to have agreed to accept in fulfilment of such contract any Cotton arbitration or appeal under Rule 12.

Bombay, ... 191 .
Brokers.

Seller's Signature . . . . . .
Buyer's Signature . . . . . .

Official Contract Form of the Bombay Cotton Trade Association, Ltd.

TABLE SHOWING THE COMMERCIAL CLASSIFICATION OF THE PRINCIPAL INDIAN COTTONS.

General Name of the Growth.	Sub-divisions of the Growth According to		Remarks.
	Province or District.	Station or Town.	
Broach or Surtee-Broach,	Broach	Miagam and to the south about 7 others.	⅞″ to 1″ staple.
	Surat	Surat, Nausári and 19 others.	
Kumpta	South Bombay	Dhárwár.	⅝″ to ⅞″ staple.
Saw-ginned Dharwár	South Bombay	Gadag.	
	South Bombay	Hubli.	
	Do.	Gadag.	
	Do.	Hubli.	
Westerns	North Bombay	Annigeri, Bágalgot, Sholápur, Belgaum, Bijápur, Miraj and about 30 others.	
	Nizam's Dominion	Raichore and 5 others.	
	Madras	Bellary and 12 others.	
Dhollera	Cutch	About 10 towns.	
	Northern Gujurát	About 20 towns.	
	Káthiáwàr	Wadhwàn, Bhávnagar, Junágad, Dhollera and about 40 others.	From many of these places a variety known as "Mathia" is also obtained which is distinguished thus: — "Bhávnagar (Mathia)."
Umras (or Umrawatti).	Belári — Berar	Amráuati and 10 others.	Short stapled.
	Belári — Central Provinces	Nágpur, Pulgaon and 10 others.	
	Khándesh — Khándesh	Jalgaon, Dhulia, and and about 20 others.	
	Khándesh — Central India	Indore and about 6 others.	Medium length.
	Khándesh — Central Provinces	Burhánpur.	
	Khándesh — Central Provinces	Harda.	
	Khándesh — Central Provinces	Khandwa.	
	Berar	Akola and 20 others.	This is Umras proper and fairly long in staple.
	Hinganghát	Hinganghát and about 2 others.	Long staple.
	Bàrsi	Bàrsi and 10 others.	
	Nagar	Ahmednagar and 10 others.	

TABLE SHOWING THE COMMERCIAL CLASSIFICATION OF THE PRINCIPAL INDIAN COTTONS.— CONTINUED.

Bengals	Rájputána	Kekvi and 20 others.	Improving in quality.
	Central India		
	Bengal	Comilla.	This is Bengal proper.
	United Provinces	Cawnpore and about 20 others.	Short staple.
Sind, Punjáb		Over 30 stations in Sind, and Punjab.	
	Madras	Coconada and Gantur.	
Coconada			
	Do.	Coimbatore and about 12 others.	
Tinnevelly		South of Madras and Bombay Presidency.	1″ and more, long staple, heavy yielder; second "flush" inferior quality.
	Do.		
Tinnevelly Americon, or Cambodia			

FINAL ESTIMATE OF THE COTTON CROP OF INDIA (IN THOUSANDS).

Provinces and States.	1911-12. Area (acres)	1911-12. Yield. (bales)	1910-11. Area (acres)	1910-11. Yield (bales)	1909-10. Area (acres)	1909-10. Yield (bales)
Bombay (*a*)	4,688	556	6,528	1,316	5,794	1,426
Central Provinces and Berar	4,632	913	4,487	629	4,167	1,070
Madras (*a*)	2,149	250	1,873	235	1,569	180
Punjab (*a*)	1,584	241	1,385	306	1,436	396
United Provinces (*a*)	921	251	1,347	348	1,241	384
Sind (*a*)	330	120	279	97	214	104
Burma	183	34	167	28	198	32
Eastern Bengal and Assam	101	20	101	31	99	18
Bengal (*b*)	92	21	68	18	67	17
North-West Frontier	56	12	33	8	32	7
Ajmer-Merwara	25	11	45	20	39	13
Hyderbad	3,234	300	3,562	293	3,401	461
Central India	1,391	227	1,349	237	1,068	221
Barodo	665	96	806	134	675	235
Rajputana	(*c*)263	(*c*)73	465	143	464	148
Mysore	(*d*)99	(*d*)10	100	10	81	6
Total	20,393	3,135	22,595	3,853	20,545	4,718

N. B. — A bale contains 400 pounds of cleaned cotton.

(*a*) Including Native States within provincial boundaries. (*b*) Excluding Native States for which the yield is roughly estimated at 1,000 bales. (*c*) For certain States figures reported in the December forecast have been taken to make up the total as final reports from those States have not been received. (*d*) Taken from the December forcast as final report has not been received. Final report just received gives 101,000 acres and 17,000 bales.

The PRESIDENT. The next item on the program is that of balloting for new members, and I will ask the Secretary to read the list of proposed members as submitted by the Board of Government to the Association.

The Secretary read the list of candidates, as follows:

FOR ACTIVE MEMBERSHIP.

WILLIAM BAMBER, Supt. Manhassett Mfg. Co., Seward St., Putnam, Conn.
By ROBERT WILLIAM BOYS.

RICHARD BOARDMAN, Supt. Barnard Manufacturing Co., P. O. Box 748, Fall River, Mass.
By N. B. BORDEN, Jr.

FLETCHER S. BROWN, Supt. Warren Cotton Mills, West Warren, Mass.
By WALTER B. HALL.

W. IRVING BULLARD, Vice Prest. Killingly Manufacturing Co., Vice Prest. E. H. Jacobs Mfg. Co., Danielson, Conn.
By WILLIAM H. GARNER.

RICHARD H. FISH, Asst. Supt. The Esmond Mills, Esmond, R. I.
By FREDERIC W. HOWE.

CHARLES L. HARDING, Prest. Whitman Mills, Holmes Mfg. Co., Samoset Worsted Mills, 25 Arch St., Boston, Mass.
By EDWIN FARNHAM GREENE.

JOSEPH B. MCINTYRE, Treas. American Textile Co., Pawtucket, R. I.
By W. H. SMITH.

SAMUEL DUNN PARKER, Treas. Ipswich Mills, 201 Devonshire St., Room 804, Boston, Mass.
By EDWIN FARNHAM GREENE.

FRED W. STEELE, Agent Fisher Manufacturing Co., Fisherville, Mass.
By FREDERIC W. HOWE.

J. B. UPRIGHT, Agent Saratoga Victory Manufacturing Co., Victory Mills, N. Y. By F. H. MCDEVITT.

NELSON D. WHITE, Gen. Mgr. N. D. White & Sons, Winchendon, Mass.
By RUSSELL B. LOWE.

FOR ASSOCIATE MEMBERSHIP.

FREDERICK M. ARMSTRONG, Fales & Jenks Machine Co., 67 Potter St., Pawtucket, R. I.
By JOSEPH MERRIAM.

ALBION L. BUCKNAM, American Moistening Co., 120 Franklin St., Boston, Mass. By FRANK B. COMINS.

GEORGE BRADFORD CHADWICK, Cotton Yarn Broker, 213 Industrial Trust Building, Providence, R. I.
By J. H. HAMBLY.

JOHN HILL, Textile Machinery, Third National Bank Building, Atlanta, Ga. By FRANK B. COMINS.

JAMES CARLTON HOWE, Vice Prest. and Gen. Mgr. Lowell Machine Shop, Lowell, Mass.
By EDWIN FARNHAM GREENE.

ALLAN MCNAB, Jr., Engineer, Lockwood, Greene & Co., 60 Federal St., Boston, Mass. By S. HAROLD GREENE.

ALBERT L. SCOTT, Treas. Lockwood, Greene & Co., 60 Federal St., Boston, Mass.
By EDWIN FARNHAM GREENE.

FRANKLIN P. SHUMWAY, Prest. Franklin P. Shumway Co., 373 Washington St., Boston, Mass.
By JAMES F. DORSEY.

JOSEPH J. SMITH, Wm. Firth Co., 200 Devonshire St., Room 558, Boston, Mass. By WILLIAM FIRTH.

Mr. FREDERICK B. MACY. If it is in order I move that the Secretary cast one ballot for the names as read. That can be done, I think, by unanimous consent.

The motion was seconded.

The PRESIDENT. There are no lawyers here to object.

The motion to direct the Secretary to cast one ballot for the names as read was put to vote and unanimously carried.

The SECRETARY. I cast this my ballot for the names which have already been read.

The PRESIDENT. I declare that the gentlemen whose names have been read by the Secretary are hereby respectively elected active and associate members of the Association.

The next paper is one of considerable interest to those of us who are engaged in the manufacture of fine cotton goods or yarns. Mr. HOWARD S. REED will speak upon The California

Long Staple Cotton District and for that reason I think we will all listen with much interest to what he has to say, especially those of us who know the difficulties which are being experienced in getting long staple cotton from the old delta districts and the north Texas districts of our Southland, the eastern and southern districts. And I therefore take great pleasure at this time in introducing Mr. REED, who will speak on the subject.

THE CALIFORNIA NEW LONG STAPLE COTTON DISTRICT.

HOWARD S. REED, Winner of the Thompson Trophy, Awarded to the Champion Cotton Grower of the United States.

I am a cotton grower and have been accused of being one of the most low down cotton farmers in America, and I can not deny the accusation, since my farm is in a district one hundred seventy feet below the level of the sea; notwithstanding this, none of us wear diver's suits or have mermaid wives, as the ocean is kept out by a rim of mountains surrounding the valley.

I am going to tell you of a country where towns are built over night in a district, where twelve years ago, not a white man lived, and not even a Cocopah Indian or a Coyote could live on account of the total absence of water, of a country with a soil a thousand feet deep, incapable of exhaustion by man, of a country fast filling with red-blooded, virile young men, with progressiveness unchecked by the usual quota of old-timers or moss-backs, of a white man's cotton country, where there are no unprogressive black men, unwilling to adopt new modern methods or improve their strain of cotton.

It is certain that the cotton spinners of America will listen with interest to the announcement of the discovery of a new long staple cotton country. That the new country lies within the borders of our United States is the more surprising, for it has long been presumed that you knew the exact boundaries of the cotton growing districts.

The new country is in every respect a second Nile Valley, lying in the extreme southwest corner of the United States, where the great Colorado River passes between Arizona and

California and finds its way into the Gulf of California. There in the midst of hundreds of square miles of barren desert is a great depressed basin, below sea level and more than twice the size of the state of Rhode Island, with a soil capable of producing a bale to the acre of the most desirable cotton in the world, the American Long Staple.

CHARACTER OF SOIL.

The entire Imperial Valley is composed of an alluvial silt soil deposited there when the valley was the delta of the great Colorado River, and the head of the Gulf of California. Every farmer feels that each acre he owns extends down a thousand feet in depth of the same character of soil he is tilling on the surface.

I have been asked by many how long we may continue to grow cotton without a rotation or change, and I answer by stating that we can continue just as they have done along the Egyptian Nile; our soil being the same and the fertility being kept up by constant deposits of silt spread over the ground with every irrigation, the Colorado River carrying the rich fertilizing silt in suspension in the water, which deposits about nine tons annually on every acre during the season's irrigating.

Our summers are long, giving us a very long growing season. The temperature is generally about 100 to 110 degrees, with an occasional rise as high as 118 degrees; but the atmosphere is as dry as that of the Sahara, and consequently not oppressive or as enervating as the moist heat of the Southern States.

CROPS.

We hardly yet realize what varied products our country is capable of producing. Thousands of acres are now in alfalfa, but the best we have been able to harvest has been nine crops of hay per acre per year, with an average of seven crops ordinarily. Over these green alfalfa fields roam thousands of head of dairy cows, yielding last year a revenue of over one million dollars in creamery butter.

In winter, miles upon miles of green fields of barley are seen upon all sides. The intense farmers are growing melons,

asparagus, and tomatoes, in the early summer, and in the winter, cabbage and Bermuda onions.

We hold the world's record for being the largest canteloupe-growing district, as well as the earliest. Every canteloupe you get up to the Fourth of July you may be sure came from our valley. So great has this industry become, that we now pick, pack and ship out a train of refrigerator cars a mile long every twenty-four hours during the height of the season. To give you an idea of how prolific they are, I will add that, personally, I grew and shipped last year, from one crop of canteloupes, 500,-000 melons from one field of 50 acres.

IRRIGATION SYSTEM.

There are at the present time about 250,000 acres in cultivation, supplied by 700 miles of irrigating ditches, costing $5,550,-000. The supply of water is taken from the Colorado River and carried by means of a 60-mile main canal around through Lower California and back into the State of California, where the water is divided up into smaller canals spreading out over the valley on each section line.

This great irrigation system, now under the control of the Southern Pacific Railroad, supplies water cheaper than any other system in the west; the farmers paying $25 per acre share for perpetual water right, and an annual delivery rate of fifty cents per acre foot for water used; three-acre feet being the maximum amount used. An acre foot of water is sufficient water to cover one acre 12 inches deep, and is ordinarily applied at the rate of about 3 to 4 inches of water at each irrigation. There is several times as much water going to waste in the river as we are able to use.

LABOR.

A large percentage of our labor is a superior kind of white labor, receiving from $35 to $40 per month, and board. During harvest time, large numbers of Mexicans and Japanese come into the valley. We have never experienced a shortage of cotton pickers, for the reason that our climate permits us to pick cotton from September until February of the following spring, without rains to damage or discolor the cotton.

LAND VALUES.

The lands were never controlled by land companies, owing to its having all been government land and filed and settled upon by individual settlers in tracts of from 160 to 320 acres. Uncultivated lands can be obtained with perpetual water rights at about $100 per acre. Those which have been improved and in crops, at about $150 per acre. Similar lands under irrigation in Egypt are bringing from $500 to $600 per acre, and it is but reasonable to expect our lands to increase more than 100 per cent. in value during the next three years, based upon their income or productive value.

METHODS OF COTTON CULTIVATION.

In preparing the land for cotton growing, it is plowed and thrown into ridges or beds 4 feet apart, and the seed drilled into the top of these beds. The water is then turned down the rows between the ridges, a small stream being used so as to permit the water to percolate down through the ground as deeply as possible. This irrigation is sufficient to cause the seed to germinate and appear above ground about the tenth day, with favorable weather. Formerly we followed the custom of irrigating the young cotton plants about every ten days or two weeks, but we have lately discovered that this system of irrigation was a mistake, as it caused the young plants to form a large surface root system. We now keep the water off just as long as possible, which causes the plant to send down a long tap root without laterals and reaching down deep for the moisure below. We find the best results obtained where the water is kept off the plants until about time for the first blossoms. As the fruiting period comes on, we then have a strong deep-rooted plant to which we feed the water by irrigation every two weeks throughout the balance of the fruiting period, which continues until the last of November, when we have several light frosts. Owing to the richness of the soil and the abundance of applied moisture which is under the growers' control, the cotton gets no set-backs as in the South during hot, dry periods. Consequently, the cotton plants are much larger and more vigorous than those grown under the uncertain rainfall conditions of Southern States,

and we find that we must grow our plants considerably farther apart in the row. The cotton is chopped or thinned out to a distance of 18 to 22 inches. It has been the custom to cultivate with one and two horse cultivators about four times before the cotton becomes too high.

COST OF PRODUCTION AND PROFIT.

Based upon my personal experience, as well as gathering of information from our various growers, it appears that a fair estimate of the cost of growing cotton averages about $12 per 500 pound bale, on a basis of a bale per acre. To this is added $15 for picking and $5 for baling, making the total of $32 per bale ready for shipment.

It is readily seen that we should confine ourselves to producing only high priced long staples, and if this is done we can figure on 20 cents, or $100 per bale for our long staples. After adding $7 for the value of the seed, the gross return is $107. Deducting the cost of production $32, plus $15 additional for extra cost of picking the long staple as compared to the ordinary cottons, there appears a net profit of $60 per bale.

Last year there were 11,000 acres planted. After a careful inspection of the fields through the valley, I determined that a deduction of a little in excess of 10 per cent. should be made for the field or portions of fields not cultivated and allowed to go after planting. The actual number of bales shipped then shows an average yield of one bale to the acre.

In the face of the fact that the farmers are all novices and inexperienced in cotton growing, it must be admitted that they have made a showing unequaled in any other country in the world.

It is expected that they can increase this average when they all learn how and when to apply the irrigations. Each year I have inspected the different plantations and invariably found more than half the growers had decreased their yield 25 per cent. to 50 per cent. through lack of knowledge of when and when not to apply water. They either applied too much and too frequent water during the first sixty days when the root system was being established, or else stopped irrigating too soon

in the fall when the plants could have continued growing and putting on fruit for a month or six weeks. They must learn to keep them growing right up until frost.

It has recently been found that cotton growing in the southern half of the valley across the boundary upon the Lower California, or Mexican side, offers some special advantages not possible on the California side, and several cotton plantations were started there this year.

Mexican and Chinese labor are available there at one-half the price we pay on the California side, and there undoubtedly will be large areas put to cotton on that side next year.

PRESENT AND FUTURE MARKETS.

Up to the present time our growers have received low prices for their cotton, owing to two conditions which can be changed. One is the lack of competitive buyers there on the ground, and the other, the lack of co-operation among the growers, and the hiring of expert classers to class their cottons and enable them to ship direct to Eastern brokers and buyers.

It is to be hoped that the recently organized Growers' Association will meet with the proper co-operation of the farmers, and that they will assemble their cotton at warehouses in the valley, there to be classed and shipped by the Association direct to the markets.

The farmers have also made the mistake of harvesting their crop all in one picking, instead of making two separate pickings, thereby keeping the long and short cotton separate.

Some of the crop is now sent by buyers to the Orient, some is secured by the Oakland Cotton Mills, at Oakland, Cal., and the balance of the crop goes to New Orleans by rail.

By the close of another year the Panama Canal will be completed, thereby permitting all-water shipments direct to the mills on the Atlantic Coast, which will materially reduce the present rail rate of $1.28.

Several manufacturers have asked me if there were opportunities for the establishment of cotton mills on the coast near by our valley. My answer to this question is that the time is not ripe for such an enterprise, owing to the fact that it is not pos-

sible for us to secure the same cheap foreign labor as you do on the Atlantic coast. When the Panama Canal is completed, thousands of emigrants from the Mediterranean countries of Europe will be enabled to reach the Pacific coast by water, thereby making it possible for all manufacturing industries to avail themselves of the same priced labor you have on the Atlantic coast.

Some years ago the government established an Egyptian Cotton Breeding Farm in California on the Colorado River, also one in Arizona. By systematic work and aided by our extraordinary soil and climate, they are now producing an improved strain of Egyptian Cotton, far superior in length, regularity, strength and color, and have increased the yield from three hundred pounds, the average in Egypt, to seven hundred and fifty pounds of lint, equaling a bale and a half per acre.

The Department of Agriculture has issued a report on growing Egyptian cotton in the southwest, which says in part: "Experiments with Egyptian cotton have been carried on during the past nine years in the southwestern United States. The results have been sufficiently good to justify the recommendation that it now be tried on a commercial scale by farmers in the irrigated sections of southern Arizona and southeastern California. It should be definitely understood that Egyptian cotton is not a high priced speculative crop like many orchard fruits and truck crops. It is to be classed as a staple crop like grain and alfalfa, instead of being a perishable crop like citrus fruits, canteloupes or garden truck."

"Under favorable conditions and with good care it is to be expected that Egyptian cotton will yield from fifteen hundred to two thousand pounds of seed cotton per acre. At the usual rate of about twenty-eight pounds of fibre from one hundred pounds of seed cotton, a yield of eighteen hundred pounds per acre would produce a five hundred pound bale of fibre and thirteen hundred pounds of seed."

"Egyptian cotton is a special type. Its production on a large scale is at present confined to Egypt, where, during the last twelve or thirteen years, the average total crop has been approximately 600,000,000 pounds or about 1,200,000 American bales. Of this quantity an average of about 55,000,000 pounds has been exported to the United States."

"The largest item of expense is the cost of picking the crop, which is more than with upland cotton. On the other hand, the greater value of the product of the Egyptian type of cotton permits larger returns to be obtained. It is believed that the most satisfactory and profitable returns will be obtained where small acreages are planted by each family, so that the picking may be done without employing extra labor."

Understand that we are not now a Long Staple district, but are growing mostly short staple upland, some Egyptian, and just starting on long staple.

Last winter, after our country won the Grand Cotton Championship Trophy of America for the best upland cotton for yield and quality combined, I came East in behalf of my brother planters to meet some of the manufacturers and have them tell us what kind and character of cotton you wished us to grow. When I left home, I was under the impression that you would tell me that you wanted us to devote our district to Egyptian cotton exclusively.

Arriving first at New Bedford, I appeared before the Cotton Manufacturers' Association of that city, and after explaining my mission in quest of reliable information direct from the consuming manufacturers as to the proper variety of cotton for our growers to specialize on, they passed the following resolutions at a special meeting held January 16, 1912, urging our growers to destroy all varieties of upland seed now on hand and start anew with a pure strain of American Long Staple; also to change the present covering of bagging to burlap, similar to that used on Egyptian bales:

Whereas, the capacity of the South for producing the Peeler or American long staple type of cotton grown upon the richer soils is being rapidly decreased by the boll weevil; and

Whereas, this is the type of cotton most desirable and most difficult for the cotton manufacturers of New England to obtain in sufficient quantity, a special meeting of the Cotton Manufacturers of New Bedford has been convened this sixteenth day of January, 1912, for the special purpose of informing the cotton growers of Imperial Valley of California as to their market requirements and to guide them in selecting the proper variety of cotton to plant in the future in order

that they may be protected against the errors made by some cotton growing communities who have spoiled their staple by crossing the different varieties in the same section; therefore, be it

Resolved, that it is the judgment of this meeting that the cotton planters of Imperial Valley be earnestly requested to at once cease planting various varieties of cotton producing varying lengths of staple and confine their planting to the American long staple type of which there is an insufficient supply and which at present is commanding a price equal to Egyptian cotton. Be it further

Resolved, that the Chamber of Commerce of the Valley be asked to take action to standardize the character and the variety to be planted and bring about a concerted action of the planters to absolutely destroy every pound of common cotton seed and every one start anew with the best seed of the American long staple, thereby enabling the farmers to rapidly make their cotton lead the world. Be it further

Resolved, that the planters have their attention particularly called to the covering of the bales, taking the Egyptian (which has a closer woven covering than the American) as the standard.

Attest:

WM. O. DEVOLL,
Secretary.

Upon going to Boston, I interviewed a number of manufacturers upon the same question of whether we should specialize upon Egyptian or American Long Staple. They all confirmed the opinion of the New Bedford spinners. MR. FRANKLIN W. HOBBS and DR. C. J. H. WOODBURY were kind enough to interest themselves in our problem and through their recommendation the Board of Government of this Association passed the following resolutions February 28, 1912:

Whereas: There is an increased demand for the American long staple cotton which is exceeding the yield; be it

Resolved: That the Board of Government of this Association express their desire that the cotton planters of Imperial Valley, California, shall devote themselves to the cultivation of American long staple cotton, which would give them a higher remuneration than any other cotton, and that they refrain from planting the short staple American upland cotton and destroy the seed, in order to prevent the deterioration of the long staple cotton by hybridization.

Resolved: That the California cotton planters be requested to pack their cotton in bales, with covering similar in character to the Egyptian cotton with its closer woven wrapping.

A true copy from the records,

Attest:

C. J. H. WOODBURY,
Secretary.

Approved:

FRANKLIN W. HOBBS,
President.

The resolutions of both organizations were read and received with great interest by our people at a mass meeting of our cotton growers held April first, this year. Unfortunately, however, the good effect was minimized by one of the government's cotton men present, who had been instructed by the Department of Agriculture to boom Egyptian cotton and induce the people to grow that variety.

At this meeting, MR. H. L. SIGOURNEY gave a most interesting talk upon the handling of cotton, having come across the continent at the solicitation of the Long Staple Committee of New England. The activity of this committee is being much appreciated by all the growers of our valley.

MESSRS. THEOPHILUS PARSONS, H. L. TIFFANY and RONALD T. LYMAN, constituting this committee of the Spinners, were the first persons to take cognizance of the opportunity to develop a new long staple district in California. So quick were they to grasp the situation and act, that they had within ninety days a cotton seed breeding farm established in Imperial Valley, which is now being operated under my direction. The purpose of this farm is to make it possible for the farmers there to obtain at cost a dependable supply of acclimated, pure bred long staple cotton seed. A good strain of inch and a quarter staple was obtained from the Mississippi Delta district. By a careful system of selection of seed from the best types of plants in the fields each season, a special acclimated and improved strain will be obtained. It has been a pleasant surprise to our farmers to meet with such prompt co-operation from this Committee, who did not require a season or two to consider the move before acting.

Through the co-operation of MESSRS. THEOPHILUS PARSONS, FREDERICK C. DUMAINE and FRANKLIN W. HOBBS, I have been enabled to secure the assistance of our own government in recommending to the government of Mexico the prohibition of the introduction of American cotton seed from the boll weevil districts of the United States into Lower California, which is Mexican territory, except when consigned direct to a government fumigation station where it could be treated to destroy the weevils and their eggs.

I have personally offered to pay for and maintain such a station in Lower California, as one-half of our Imperial Valley lies across the border into Lower California, the other half being in the State of California. We have already passed adequate laws in that state.

By the leading manufacturers, I am informed that they can now and in the future obtain all the Egyptian cotton they may require, whether it be twelve million or twenty million dollars worth, but that they can not obtain, at home or abroad, an increased supply of American Long Staple. Unfortunately, this country in a very limited area is the only known country in the entire world which can produce it, and still more unfortunately, the boll weevil has decreased this area capable of producing it.

Tell me! what are you going to do for your increased future supply? You will find it is going to be a most serious problem. Instead of the government seeking to expand the long staple growing industry, they are now engaged in promoting the growing of Egyptian cotton. It is evident that the government is desirous of making a showing, or in other words, making good in bringing about the introduction of a new Egyptian cotton growing industry here in the United States. It is also a good talking point from their standpoint, as the country is importing twelve million dollars worth of Egyptian cotton annually.

If some of your mills individually or in combination will start a long staple plantation of your own in the Imperial Valley, there is no question but what every farmer in the country would immediately follow your lead. There could be nothing done that would more surely and rapidly make that country the long staple district and stop the government's movement encouraging Egyptian cotton.

I prefer the grower's end of the cotton business to the complicated detail work of your end of the business and I hope some of you, facing nervous breakdown, will break away and come to our glorious country of continuous sunshine and try the growing end of the game—then you will marvel at the ease with which you can make just as much or perhaps more money.

I here wish to extend to those of you who are interested in your cotton supply a cordial invitation to come out this fall and see the new country and investigate thoroughly the cotton possibilities.

The time is not far distant when the mills are going to engage direct in the production of the raw product. And why not? Today, you manufacturers are at the mercy of speculators and ever fluctuating markets for your raw materials. If, for example, you controlled the production of, say, fifty per cent. of your annual requirement and were always sure a year in advance of obtaining that at a certain exact price, namely, the cost of growing, would you not be in a better position to figure upon your contracts for future delivery? Mark my words, gentlemen, you are going to see the shrewd ones among you in the near future expand and get control of their raw product at minimum cost; cut out the local buyers, factors, and broker's profits; take these themselves and then make their competitors scratch gravel to compete with them.

This is a day and age of progressiveness, so don't say the time is a long way off for this. If you want an example, look about you. See the Studebaker Manufacturing Company in their vehicle manufacturing, how they operate their saw mills, own their own forests, growing their various hard woods and own their own foundries to supply the required metal parts. See the great steel companies, who have reached out and now own mines, furnishing their supply of coal and coke; their own mines producing the ores they require in making their manufactured products. You can and will do just what they are doing. You will be compelled to if you expect to compete with English spinners in the trade opening up in Central and South America and the Orient.

There are doubtless many of you now that have not awakened

to the fact that the English spinners are getting ahead of you, are beating you to it, right here in your own country, by buying up and getting control of large areas of long staple cotton land, in the Mississippi Delta. Those conservative, long-headed Englishmen are making themselves safe on a supply of long staple at a production cost of a few cents per pound. The American spinners will awaken in two or three seasons more to find that they are having to pay forty or forty-five cents for inch and a quarter to a half staple, while their English friends are getting theirs at plantation cost, eight cents or less.

A year ago, the English began buying up large tracts of long staple cotton land in the Mississippi Delta districts and have already started raising cotton under their own experts and farm superintendents. Business men employing systematic methods can get the results in farming the same as they obtain them in their other lines of development.

Something over a year ago, the great Japanese financier, BARON MITSUI, the MORGAN of Japan, controlling their largest cotton mills, steamship lines and banks, visited California with his own Japanese cotton experts and after a careful examination, stated we had a wonderful district and a cotton that they wanted, that they would buy all the cotton we could produce in the whole country, and as soon as the new industry developed to a sufficient volume, he stood ready to put on a special line of steamers to handle the output.

And now, gentlemen, in concluding, let me ask you just this one question: Are you going to sit idly by and see the Japanese or the English get control of your most promising long staple district, or are you going to step in yourselves?

The PRESIDENT. Are there any questions which you would like to ask Mr. REED? I am sure he would be very glad to answer them. If not, Mr. WOODBURY will submit a communication.

The SECRETARY. The Committee desires to announce that the winner of the Association golf cup offered by the Board of

Government is Mr. GEORGE A. AYER, and the winner of the net cup competition, Mr. WILLIAM FIRTH. The winners of the tennis cups are Messrs. THOMAS B. HITCHCOCK and GEORGE F. STEELE.

In the baseball game, Mr. FRED W. STEELE won one cup for the highest batting average, and Mr. R. N. MACKAY won the other cup as captain of the winning team.

The above recreations took place outside of the sessions, are informal and are submitted for information, merely as enjoyable features connected with the meeting and not as a portion of the proceedings, as stated in the official call and program of the meeting.

The PRESIDENT. The next paper on the program will be given by Mr. WHEELER, on The Cauto Cotton of Cuba. I take pleasure in introducing Mr. WILLIAM W. WHEELER of Meriden, Conn.

Mr. WILLIAM W. WHEELER. Mr. President, it is with some diffidence that I appear before you tonight, because I am not a cotton manufacturer, but, like Mr. REED, an amateur cotton grower. I will state here that I have named this cotton the Cauto cotton to distinguish it from the great mass of practically worthless wild cotton which grows in Cuba. The name is taken from the Cauto River, the largest river in Cuba. It is on the eastern end of the island in the Cauto valley that our great plantation is located.

THE CAUTO COTTON OF CUBA.

WILLIAM W. WHEELER, 191 Hanover Street, Meriden, Conn.

While in eastern Cuba, in December, 1910, at a fruit plantation near Santiago, in which I was interested, I noticed a group of trees 10 to 15 feet high, apparently bearing a crop of snowballs, and the manager informed me that it was tree cotton, and that one day when passing a wild cotton tree he grabbed off a handful and planted the seeds. These trees were the result.

This was of particular interest to me, because when a boy I commenced working in the cotton mills in my birthplace, of Moodus, Conn., and continued for several years, until I had risen to be a second hand, and later in life, while in North Carolina, for two years in connection with the mining industry, I became familiar with the cultivation of American cotton which was extensively raised in that region.

Returning to the subject of the Cuban cotton, I picked some of it, and brought it to Connecticut, and showed it to some of my former associates in cotton mills who had maintained their connection with the industry, and their opinions were of such a nature that I exhibited the samples to a large number of persons engaged in the cotton manufacturing business.

This cotton ranges from 1⅛ to 1¼ inch staple, of a slightly yellow tint, and is strong as Sea Island cotton, being longer staple than the ordinary Upland, and somewhat different in texture and color. The wild cotton trees are found in that part of Cuba, and differ a great deal in the length and character

of the staple, some of it being mere down, ⅛ inch long, and from that up to the samples which I obtained.

The matter appeared so attractive to me that I planted an experimental field to prove the value of this variety of cotton, and also some of the possibilities, as well as difficulties, which would be encountered in the cultivation of this tree cotton in a large way. Ten acres were cleared and were planted from the seed taken from the few trees already growing upon the plantation. These seeds were planted about 8 feet apart, or 1,000 trees to the acre; and although one seed was planted in a hole, there should have been three or four seeds planted and the excess should have been pulled up. Indian corn was planted between the rows of the young cotton plants for two purposes; first, to furnish shade to the young plants, and second, to prevent the growth of weeds.

These seeds were planted without being ginned, as it appeared to me that this was the manner in which nature plants cotton seeds, as the lint has a purpose in nature, perhaps to protect the seed from being destroyed by insect life, as lint cotton is not eaten by insects. This is shown in protecting trees against ants, worms, or bugs, by a rope of cotton lint wound round the truck or branch to be protected. Also, the decaying cotton lint forms a vegetable humus to retain moisture, give nourishment, and to prevent the caking of the soil around the seed.

The country is quite clayey, and when the sun comes out the soil is baked almost as hard as a brick, which would prevent the tree from growing. It appeared to me that it would make a difference in the results if the cotton lint was left on the seed to give it a chance to start before the soil would be baked hard.

After the young trees had grown about 4 feet high, the tops were cut out and back to about 3 feet high, causing a vigorous side growth, giving many bearing branches, and at the same time keeping it down within reach for the purpose of picking, for a cotton tree 10 to 15 feet high the first year and growing even higher later would present difficulties in the picking of cotton in anything like the usual manner.

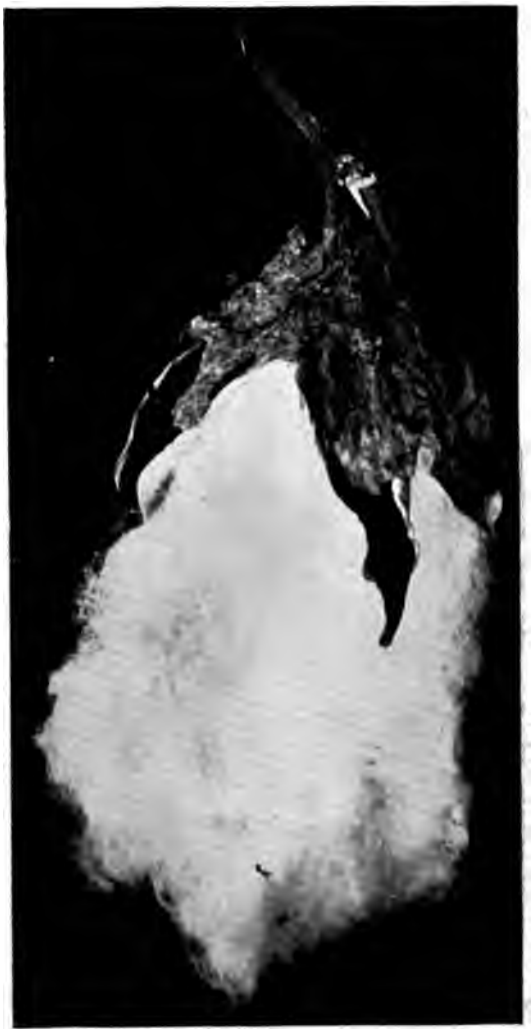

FIGURE 1. — BOLL OF CAUTO COTTON.

As there were no facilities for ginning cotton in that region, sufficient seed cotton to furnish about 1,000 pounds of lint were sent to New London, Conn., ginned, and made into two bales, which are submitted for examination.

The trees on this experimental field were trimmed and pruned, and the field weeded twice, and is now bearing the second growth, which is coming into crop, and will be ready to commence picking late in December, at the commencement of the dry season, and will continue until about April 1, when the rainy season begins.

This cotton is a perennial tree, and not, like the American cotton, an annual crop, and will continue to grow for many years. The life of the tree is not known, except that there are some of them known to be over fourteen years old. The average tree yields two to three pounds of seed cotton the first year, and fully three pounds the second year, and on the basis of this experimental field, the yield will be 2,000 pounds of seed cotton to the acre the first year, and 3,000 pounds the second year, about one-third of which is lint.

The soil is very fertile and needs only to be opened up for cultivation. It is probable that after the experience of years in cultivation, this cotton may be improved by grafting, as well as in selection of seed.

In spite of the fertility of the soil, the abundance of insect life has been one of the great obstacles to cultivation in Cuba, but none of these appear to attack the wild cotton. COLUMBUS found cotton on the island, and as it was evidently indigenous, it appeared to me that this native cotton protected itself against the ravages of insects for ages, and was a case of the "survival of the fittest." Attempts to cultivate Egyptian cotton and Sea Island cotton in Cuba have not been successful, on account of the attacks of ants and other insects, and the same may be applied to my experience with Caravonica cotton from Australian seed, which I have planted here.

This cotton has been named "Cauto" cotton to distinguish it from the generality of the wild cotton upon the island.

Cuba is an intensely fertile country of about 45,000 square miles, or that of the state of Mississippi. The climate is that of the upper tropical and free from frost. There are numerous tracts of virgin land where the ground is covered with a jungle, and never cultivated by man, which can be cleared off and burned over at an expense of $25 an acre, and is then in condition for cultivation without further preparation, ploughing, harrowing, or cross-ploughing becoming unnecessary.

As near as I have been able to estimate from my experience, the cost of this cotton is about $1.25 to $2 per hundred pounds of seed cotton, or 3¾ cents to 6 cents a pound for lint at the plantation, and could be placed upon docks at seaboard at a cost of 6 to 8 cents a pound, less the value of the seed, which is about 1 cent per pound, or 2 cents per pound for each pound of lint cotton; for the yield is about two pounds of seed to one pound of lint, which deduction from the cost of the lint would bring the cost of the lint on the dock to about 4 to 6 cents per pound, the seed being considered as a by-product.

This new form of cotton is presented to your attention as being, probably, a form of fibre which would be a valuable contribution of raw material to the textile manufacturing world. It is quite possible that there are variations in the character of the fibre which would naturally require special attention in the mills, the same as one grade of cotton differs from another, and also that it may be especially adapted to some varieties of fabrics more than others.

It would be redundant for me to state before this Association anything in regard to the world shortage of cotton, as it is perfectly well known that cotton is the cheapest of the world's fibres used in clothing, and that its properties are becoming more and more appreciated, not merely in cotton fabrics, but also in blending with wool, making a result of lesser cost, but which maintains the protecting qualities of

wool against low temperatures, and also the peculiar properties of cotton in absorbing moisture, making the blended fabrics far more comfortable to the wearer.

Whatever may be the exact method of utilization of Cauto cotton, it is confidently submitted that it has a valued purpose. EMERSON defined a weed as a plant whose virtues are unknown, and the same may be applied to Cauto cotton, which is now almost in the same position as that of the wild, uncultivated Upland cotton of the Southern states, before the invention of the American cotton gin by ELI WHITNEY made it a commercial possibility.

Mr. J. R. MONTGOMERY. I have examined with a good deal of interest the two bales of cotton that Mr. WHEELER has exhibited, and it seems to me that there is a good deal of value in them. But I would like to ask Mr. WHEELER what he proposes to do with the two bales of cotton — if he intends to put the cotton through experiments to see for what kind of fabric or what purpose it is best adapted?

Mr. W. W. WHEELER. I would say in regard to those two bales of cotton, so far as I know they are the only two of the kind in existence. One of those bales will probably go to Berlin, Germany. The other bale I wish to place in the hands of some reliable manufacturer who would have the confidence of the manufacturing world at large and would give a report saying just what it would do under action in machinery, what kind of cloth it would make, such as woolen blankets or any other fabric. I would like to learn just what it is best fitted for, and I expect to ascertain that result when one of those bales has been put to a practical test in a cotton mill.

Mr. J. R. MONTGOMERY. I think that the cotton should be put in the hands of some textile school, which has the facilities for putting it into different kinds of yarn. As I have examined this cotton it appears to have a staple of about 1⅛ inch to 1¼

inch, possibly — between those points — and rather of a coarse fibre and curly, having the characteristics of Peruvian cotton. The Peruvian cotton is best adapted to blending with wool. I believe that a textile school could make some very interesting experiments with this cotton which would command the confidence of the manufacturing public.

Mr. W. W. WHEELER. I would thank the gentleman for the suggestion.

Mr. ARTHUR H. GULLIVER. Mr. President, I would like to have that cotton handled as Mr. MONTGOMERY suggests, and through the courtesy of Mr. THOMAS and Mr. LACEY we are assured that the Lowell Textile School will be glad to make any possible experiments. The reason I favor that is that I know that this school — and I think our President will bear me out in this — has had a very wide experience in handling cotton of all descriptions. I have had a personal experience in the handling of Peruvian cotton, and know that all harsh fibres subject our card wire to very serious wear and rapidly decrease its value unless the grinding is very constantly done. I might say that no card should be left on this style of cotton without grinding twice as often as with common upland staple, and I think there are gentlemen present who will bear me out in this. I as well as Mr. MONTGOMERY have looked this cotton over, and I consider that the peculiarity of it is not only the fact of its difference in length of staple, but that it has peculiar qualities of strength and fineness of staple, and it retains the strength even in the shortest fibres. I know if that quality can be maintained and the average length of staple can be make permanent, he has found something which will have value.

Mr. W. W. WHEELER. I thank the gentleman. I would say on my own behalf that what I don't know about cotton would make a very large book, and what I do know would make only a primer. I am glad that you have given me some information in this matter and enabled me to put it in the hands of the right

parties, because my only purpose is to get at the facts of the case. I want to know its utilities and do not want to spend my time and my money upon something if it is not of practical value. At the same time, if it is right I want to have it tested out to the fullest extent.

Mr. ARTHUR H. GULLIVER. I think if you will send that bale to the textile school as before suggested, Mr. LACEY will see that the value of the staple is thoroughly tested.

Mr. W. W. WHEELER. It may be of interest to you to know that I shipped this cotton from Cuba in potato bags without its being ginned to the Brown Cotton Gin Company of New London. They ginned and baled the cotton in New London, and it came to this hotel from their works.

The PRESIDENT. The revised New England terms for buying and selling American cotton, except Sea Island, which came into effect on the first of this month, are of such great commercial importance that the Association has secured permission to insert them into the record. These rules are the co-operative work of so many committees and individuals working in co-operation with them that it would be impracticable to credit anyone with the authorship. However, these have been accepted by the Arkwright Club, The New England Cotton Buyers' Association and the Fall River Cotton Buyers' Association, which is an evidence that the rules are worth the careful scrutiny of all interested in this important subject.

REVISED NEW ENGLAND TERMS FOR BUYING AND SELLING AMERICAN COTTON.

(EXCEPT SEA ISLAND)

IN EFFECT SEPTEMBER 1, 1912. VOIDS ALL PREVIOUS ISSUES.

Accepted by
The Arkwright Club
The New England Cotton Buyers' Association
and
The Fall River Cotton Buyers' Association.

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REVISED NEW ENGLAND TERMS FOR BUYING AND SELLING AMERICAN COTTON.

(EXCEPT SEA ISLAND.)

NOTICE.

Sections designated "Short" apply to short staple cotton only.
Sections designated "Long" apply to long staple cotton only.
Sections designated "Both" apply to both long and short staple.

CLASSIFICATION.

1. (Both.) The United States Government standard classification shall be used.

2. (Both.) Sales calling for even-running grades, or made on type, may contain 5 per cent. half a grade below the grade specified if offset by an equal number of bales half a grade above that specified.

3. (Both.) Sales calling for average grade, or made on type, may contain 5 per cent. half a grade below the lowest grade specified if offset by an equal number of bales half a grade above the highest grade specified.

4. (Both). Any excess of low grade may be rejected by the purchaser, or claimed for at an allowance. If rejected, the seller is to have the right to replace and the purchaser may require replacement. The cost and actual expenses of handling rejections shall be paid by the seller.

5. (Both.) Whenever a specific lot of cotton purchased by actual samples does not equal the samples, the purchaser shall have the right to reject the lot if less than one-half is equal to the samples. If one-half or more is equal to the samples, the purchaser may reject the portion not equal to the samples, but in either event samples of the entire mark must be exhibited to the seller.

6. (Both.) The cost and actual expenses of handling the rejections shall be paid by the seller, and in case of rejection the seller shall not be called upon to replace.

DEFINITION OF SHORT STAPLE COTTON.

7. (Short.) The phrase "short staple," as used in these terms, is hereby defined to mean any length of staple shorter than 1⅛ inch, regardless of the territory from which it is shipped.

DEFINITION OF LONG STAPLE.

8. (Long.) The phrase "long staple," as used in these terms is hereby defined to mean 1⅛ inch and longer, regardless of the territory from which it is shipped.

DIFFERENCES BETWEEN GRADES.

9. (Short.) Differences between grades shall be fixed on the third Thursdays of September, November and February, and shall be the average of the differences existing on said dates in the New York, New Orleans, Memphis and Augusta Cotton Exchanges. Claims for allowances on grade of short staple cotton shall be determined as above.

CLASSERS.

10. (Short.) The New England Cotton Buyers' Association or the Fall River Cotton Buyers' Association shall employ three or more cotton classers, three of whom are to act in each case, to class or staple all cotton submitted to them.

11. (Short.) The classers shall not undertake to declare the length of any staple, but shall judge of the length of staple of any lots submitted to them only in comparison with the length of staple of a type which has been agreed upon as a standard by the purchaser and seller, and which must be submitted with the samples of the lot in question.

BOARD OF APPEAL.

12. (Both.) There shall be a Board of Appeal consisting of three members, as follows: One member of the New England Cotton Buyers' Association or the Fall River Cotton Buyers' Association and one manufacturer (with alternates to serve in case of the absence or disqualification of either) and a third to be selected by them. The Board of Appeal shall serve for one year or until their successors are appointed.

13. (Both). Any dispute between purchaser and seller as to whether a shipment conforms to the terms of a sale, the amount of any allowance, or the interpretation of any section of these terms, shall be referred to the Board of Appeal upon the request of either party in interest. The

decision of the Board of Appeal shall be final. No person interested in the cotton involved shall serve as a member of the Board of Appeal.

REDRAW SAMPLES.

14. (Both.) In all cases where claims are made for off grade or where cotton is rejected, the purchaser shall furnish full-sized, redrawn samples from each bale of each mark, if required.

SHIPMENTS.

15. (Both.) Unless otherwise specified, cotton sold for prompt or immediate shipment must be shipped and bills of lading dated within fourteen days from the date of sale.

16. (Both.) When a sale is made for shipment in a certain month or months, cotton may be shipped at any time the shipper may elect during the month or months specified, but shipments must be made and bills of lading dated within the month or months specified.

SHIPPING WEIGHTS.

17. (Both.) All sales shall be on the basis of guaranteed invoice weights.

18. (Short.) All short staple cotton from the States of Texas, Arkansas and Mississippi (with the exception of the upland portions) and from the New Orleans, Memphis and St. Louis markets shall be sold on the basis of 53,000 pounds for each 100 bales, and from the States of Oklahoma, North Carolina, South Carolina, Georgia, Alabama, Tennessee and the upland portions of Mississippi on the basis of 50,000 pounds for each 100 bales; there may be a variation of 5 per cent. either way, in each case.

19. (Long.) All long staple cotton shall be sold on the basis of 53,000 pounds for each 100 bales, with a variation of 5 per cent. either way.

20. (Both.) If the number of bales shipped does not make the weight as above provided, the shipper may be required to add a sufficient number of bales to bring the total weight of the cotton delivered up to the weight called for on the above basis.

21. (Both.) If a less number of bales than the number sold will give the weight called for on the above basis, the purchaser may require that the number of bales delivered shall be reduced accordingly.

22. (Both.) Written notice of any dissatisfaction with respect to ship-

ping weights under the two preceding sections must be given by the purchaser not later than three days after receipt of invoice.

SCALES.

23. (Both). The purchaser shall have his scales tested and certified by a Sealer of Weights and Measures at least every three months, and the date when they were last tested shall be shown on all weights and tare returns.

RECEIVING WEIGHTS.

24. (Both). Cotton must be weighed as promptly as possible, but within forty-eight hours from the time it is taken from the car, or otherwise unloaded, and before it is stored. The receiving weight shall be tagged on each bale. There shall be ¼ pound per bale allowance after forty-eight hours for every day's delay in weighing.

25. (Both.) All cotton must be weighed before any samples or bands have been removed.

26. (Both.) All returns of weights must be sworn to or signed by a sworn weigher.

27. (Both.) In case of loss in weight separate detailed weight returns for each mark showing the gross weight of each bale (without any deductions for dampness, extra bands or any other cause) must be given to the seller within fifteen days after receipt of cotton by the purchaser.

28. (Both.) When 95 per cent. of the cotton is received, if the balance of the shipment does not arrive within the next fifteen days, the weight shall be reported as in Section 27, taking the average invoice weight for the short bales. The loss in weight shall be adjusted on this basis, and such weight settlement shall be final.

29. (Both.) If missing bales do not arrive within thirty days after the date of a claim for loss in weight, the purchaser shall make a claim against the transportation companies for the number of bales missing at that time, at the invoice weight and price, such claim to be filed for collection with the New England Freight Claim Bureau, either directly by the purchaser or through the seller.

30. (Both.) When cotton is received by the purchaser in a wet or damaged condition it shall be immediately weighed and the seller and the transportation company notified in writing of its condition. The cotton shall be receipted for by the purchaser to the transportation

company under protest, and the seller shall be immediately notified of such protest.

31. (Both.) Such cotton shall be held, giving the shipper an opportunity to investigate, but the purchaser shall not be required to so hold it for a longer period than ten days.

32. (Both.) Upon request all returns of weights must be dated, showing when the cotton arrived and when it was weighed, upon blanks in the following form:

33. (Both.) *Dates Arrival and Weighing.*

. . . . . 191 . .

This is to certify that . . B/C marked . . . . . shipped . . . . . 191 . .

by . . . . . to . . . . . .

arrived at the mills and were weighed on the dates shown below.

DATE OF ARRIVAL.		DATE WEIGHED.	
. . B/C arrived . . . . . 191 . .	and were weighed	191 . .	weight . .
. . B/C arrived . . . . . 191 . .	and were weighed	191 . .	weight . .
. . B/C arrived . . . . . 191 . .	and were weighed	191 . .	weight . .
. . B/C arrived . . . . . 191 . .	and were weighed	191 . .	weight . .
. . B/C arrived . . . . . 191 . .	and were weighed	191 . .	weight . .

. . . . . .

By . . . . . .

NOTE. Printed blank forms like above will be furnished by the New England or the Fall River Cotton Buyers' Association on request.

CLAIMS — LOSS IN WEIGHT.

34. (Both.) Claims for loss in weight shall be made on the basis of each separate invoice.

35. (Both.) In case of excessive loss in weight, *i. e.*, 5 pounds per bale, from the invoice weight, the cotton shall be held and the seller notified and given an opportunity to reweigh if he desires, but the purchaser shall not be required to hold the cotton for the purpose of reweighing for a longer period than ten days. Nothing in this section, however, shall be construed to prohibit the seller from weighing a lot losing less than 5 pounds per bale if he so desires and if it is practicable. If the cotton is held in a heated warehouse proper allowance shall be made for extra shrinkage.

36. (Both.) If the seller desires to reweigh and the purchaser cannot furnish immediate access to the cotton, he shall be allowed ten days to put the cotton in position for reweighing. If at the end of ten days the purchaser is still unable to afford access to the cotton, he shall

allow the seller ¼ pound per bale for each day thereafter until the cotton is accessible for reweighing.

37. (Both.) On reweighed cotton there shall be an allowance of ¼ pound per bale for sampling and 1¼ pounds for each band removed by the purchaser.

38. (Both.) Claims for loss in weight shall be accompanied by the purchaser's detailed weight lists of each mark and by a certificate, as follows:

39. (Both.) *Form of Weight Return.*

. . . . . 191 . .

This is to certify that . . . . . B/C marked . . . . . .

invoiced to . . . . . .

were weighed promptly (within 48 hours) after arrival and before any samples or bands were removed from any of the bales by us; also that the individual weights of the bales as shown on the attached detailed weight list are the gross weights of each bale and that the scale on which they were weighed was last tested and certified by a Sealer of Weights and Measures on . . . . . 191 . .

. . . . . .

By . . . . . .

NOTE. Printed blank forms like above will be furnished on application to the New England or the Fall River Cotton Buyers' Association.

40. (Both.) If, on reweighing the reweights agree with the original receiving weights within 1 pound per bale (after due allowance is made for shrinkage, samples and bands, as per Sections 35 and 37), the claim shall be settled on the original receiving weights and the seller shall pay the cost of reweighing, and also the charge for handling.

41. (Both.) If the reweights show a gain between 1 and 2 pounds per bale over the original receiving weights (after due allowance is made for shrinkage, samples and bands, as per Sections 35 and 37), the claim shall be settled on the reweights, the seller paying the cost of reweighing, the purchaser making no charge for handling.

42. (Both.) If the reweights show a gain of more than 2 pounds per bale over the original receiving weights (after due allowance is made for shrinkage, samples and bands, as per Sections 35 and 37), the claim shall be settled on the reweights, and the purchaser shall pay the cost of reweighing and shall make no charge for handling.

43. (Both.) The charge for handling on reweighed cotton shall be the amount of the actual cost to the purchaser of handling, but not exceeding 10 cents per bale.

44. (Both.) The first 10 bales of each mark of 100 bales or less taken out of a car, or otherwise unloaded at destination, shall be tagged with a red tag and indicated by a cross on return of weights to the seller. If there are more than 100 bales in the mark, a number of bales equal to 10% of the mark shall be thus set aside, tagged and indicated.

45. (Both.) When opened, the bagging and ties on each of the bales so tagged shall be weighed and a certificate shall be furnished the seller showing: *(a)* the gross weight of each bale at the time of its receipt, *(b)* the number of ties on each bale, and *(c)* the weight of the bagging and ties on each bale. The certificate shall also state that the bales so listed were the first unloaded of the mark and that the bagging was dry when weighed. The average gross tare per bale determined in the above manner shall be taken as the average tare for the entire mark.

46. (Both.) *Form of Tare Return.*

Tare Test on . . . . . B/C, set aside . . . . . 191 . .
by . . . . . Mills, being part of . . . . . bales
invoiced . . . . . 191 . . by . . . . . .

Tag Number (optional).	Mark.	Gross Weight of Bale.	Number Bands.	Weight Bands (optional).	Weight Bagging (optional).	Gross Tare.

This is to certify that the above statement is correct and that the bales hereon listed were the first bales of this mark unloaded at the mill and that the bagging was dry when weighed. The scale on which they were weighed was last tested and certified by a Sealer of Weights and Measures on . . . . . 191 . .

. . . . . .

. . . . . .

NOTE. Printed blank forms like above will be furnished on application to the New England or the Fall River Cotton Buyers' Association.

47. (Both.) All returns for tare must be sworn to or signed by a sworn weigher.

48. (Both.) The allowance for tare shall be an average of 24 pounds per bale. The purchaser shall be reimbursed for all tare in excess of this average at the invoice value less ½ cent per pound.

49. (Both.) All claims for excess tare shall be presented within 20 days from the date on which the average gross tare is ascertained as above, but not later than nine months from the date of the receipt of the cotton.

50. (Both.) Excess tare claims are entirely independent of claims for loss in weight. Gain in weight of the cotton itself may not be applied against a claim for excess tare.

CLAIMS — GRADE AND STAPLE (SHORT.)

51. (Short.) Claims for grade or staple must be made as soon as possible, but not later than thirty days from the date of the receipt of the cotton.

52. (Short.) When 95% of the cotton is received, if the balance of the shipment does not arrive within thirty days, claims for grade or staple may be made on the lot as a whole on the average of the cotton received.

53. (Short.) Claims for grade on any portion of a mark must be accompanied by samples of the entire mark. If such samples are not furnished, bales not exceeding 5% of the entire mark shall pass if said bales are not more than one-half grade "off."

54. (Short.) The seller must be notified immediately if the cotton shows "off grade" or "off staple" on inspection. Such notification shall not be delayed until the entire lot is received.

55. (Short.) Claims for allowance on difference in staple or grade of short staple cotton, except $1\frac{1}{16}$–$1\frac{1}{8}$ inches, shall be settled according to the differences existing at the time of shipment, as provided in Section 9.

56. (Short.) Claims for allowances on differences on cotton sold as $1\frac{1}{16}$–$1\frac{1}{8}$ inches shall be settled (except in case replacement is required, as provided in Section 61) on the prevailing differences existing at the time of shipment, provided no more than 15% of the mark is off.

57. (Short.) If more than 15% of the mark is off grade or staple, the entire number of bales of such cotton shall be settled for by the seller on the differences existing at the time of the arrival of the cotton.

58. (Short.) The above terms for claims on grade or staple are not to apply to long staple cotton, viz., $1\frac{1}{8}$ inches and longer; but terms for tare and weight shall apply to American long staple cotton, except Sea Island.

CLAIMS — FALSE, MIXED, WATER-PACKED.

59. (Both.) In case of false-packed, mixed-packed or water-packed bales, the purchaser shall use the portion of the bale that is right.

60. (Both.) The inferior portion is to be used, if possible, at an allowance; but if not, the purchaser shall return the inferior portion with tags and sworn statement, and be paid for the same at the invoice price of sale.

REPLACEMENT.

61. (Both.) If cotton is rejected by the purchaser on account of its being a quality inferior to the terms of sale, and if a settlement is not made with the purchaser at an allowance, replacement shall be made of the same weight within 5%.

62. (Both.) Replacements must be shipped promptly, but in case of scarcity of the quality required the seller shall be allowed such additional time for replacement as he may show to be necessary, but in any event not over thirty days, except by agreement with purchaser.

63. (Both.) All actual expenses incurred by reason of the necessity of replacement shall be borne by the seller.

ARBITRATION — SHORT STAPLE.

64. (Short.) In cases where the seller and the purchaser cannot agree as to the grade or staple of short staple cotton, redrawn samples shall be submitted to the classers, and if their decision is not satisfactory to both parties, or in case any dispute still exists between them, the matter shall be referred to the Board of Appeal upon request of either party.

65. (Short.) No person interested in the cotton involved in the arbitration shall serve as classer.

66. (Short.) The purchaser shall pay the total cost per bale of the arbitration on the number of bales that are found to be equal to the contract, and the seller shall pay at the same rate on the number of bales found to be not equal to the contract. If a bale is off in grade and up in staple, the seller pays for what is off in grade and the buyer pays for stapling.

67. (Short.) In all cases of arbitration between a manufacturer and a member of the New England Cotton Buyers' Association or a member of the Fall River Cotton Buyers' Association a charge of 15

cents per bale shall be made for classing and 15 cents per bale for stapling. For non-members the charge shall be 20 cents for classing and 20 cents for stapling.

68. (Short.) In all cases of arbitration the names of the purchaser and seller shall not appear, nor shall the identifying marks of the cotton be known, but the cotton shall be submitted to arbitration under bale numbers or lot numbers, as, for example, "Lot No. 6."

INSURANCE.

69. (Both.) Unless otherwise specified on sale note, the purchaser shall cover all his cotton with transit insurance.

70. (Both.) All purchases from or via Atlantic ports shall be based on the "rail and water" insurance rates.

71. (Both.) All other purchases shall be based on the "all rail" insurance rates, except shipments by specified sailings from Gulf ports.

72. (Both.) The purchaser shall be reimbursed for any extra insurance on shipments moving from or via Gulf ports, except when the cotton is sold specifically as sailing or shipment from such ports, in which case there shall be no claim upon the seller for difference in the insurance rate.

BURNT OR LOST COTTON.

73. (Both.) In all cases where cotton is lost or destroyed in transit, the contract shall be annulled thereby to the extent of such loss or destruction.

CLAIMS—GRADE AND STAPLE (LONG).

74. (Long.) Claims for grade and staple must be made within fifteen days from the date of the receipt of the last portion of a shipment, but the seller must be notified immediately if the cotton shows "off grade" or "off staple" on inspection. Such notification shall not be delayed until the entire lot is received.

75. (Long.) Claims for allowances on differences on staple cotton sold as 1 1/8 inches or longer shall be settled (except in case replacement is required as provided in Section 61) on the prevailing differences existing at the time of shipment, provided no more than 15 per cent. of the mark is off.

76. (Long.) If more than 15 per cent. of the mark is off grade or staple, the entire number of bales of such cotton shall be settled for by the seller on the differences existing at the time of the arrival of the cotton.

ARBITRATION—LONG STAPLE.

77. (Long.) In case of difference of opinion on cottons 1 1/8 inches or longer staple sold on type, the purchaser and seller shall each choose an arbitrator. These two arbitrators shall agree on a third, and if these two cannot agree on a third arbitrator they shall each name an arbitrator and he shall be chosen by lot.

78. (Long.) The arbitrators shall each be paid ten cents per bale. The entire cost of arbitration, including sampling and other expenses, shall be borne by the purchaser and seller. The purchaser shall pay the total cost per bale of the arbitration on the number of bales found equal to the contract and the seller shall pay at the same rate for the number of bales found not equal to the contract. If a bale is off in grade and up in staple, the seller pays for what is off in grade and the buyer pays for stapling.

79. (Long.) In case of any difference of opinion on long staple cotton sold on description, the purchaser and seller shall agree on a type as a standard of length and character before submitting the same for arbitration. The arbitration shall then be decided by three arbitrators as provided for in the case of long staple cotton sold on type.

80. (Both.) These revised terms shall take effect on all sales made on and after September 1, 1912.

The PRESIDENT. If there is no other business to come before the meeting, I will declare the ninety-third meeting of the Association adjourned.

Adjourned at 9.27 P. M.

Attest:

C. J. H. WOODBURY,
Secretary.

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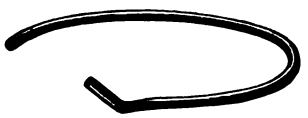

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Mill assistant superintendents	9	In business, textile distributing or incidental thereto	6
Mill foreman of departments	14	Other business	13
Assistant to superintendents	2	Third hands	1
Mill auditors and accountants	7	Weavers	1
Second hands	9	Students	2
Clerks	5	Married women	3
Textile designers	16	Textile manufacturing, unassigned	12
In commission houses	6	Employment not known	16
Wool houses	1	Not employed	7
Salesmen	4	Deceased	3
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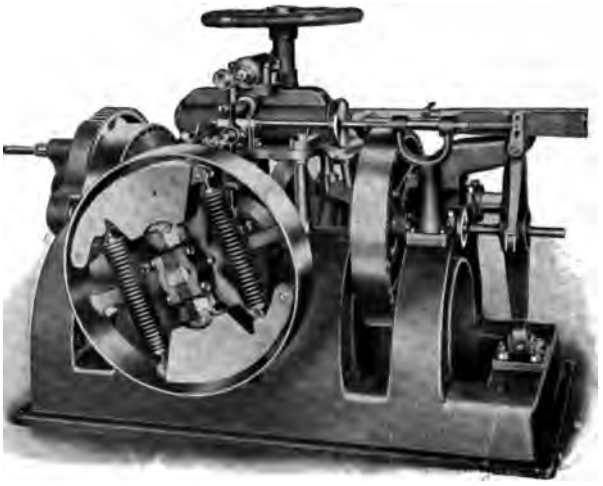

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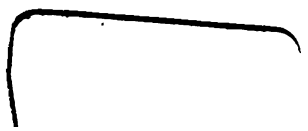
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